Video cassette recorder VR3241/95

Service
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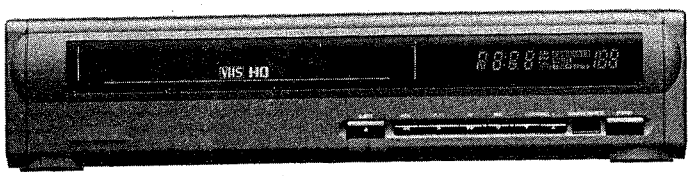

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Service Manual

VHS
PAL

VR3241/95 is a video cassette recorder with a TV-reception part and electronic timer, suitable for recording and playing back TV-signals which meet the CCIR-PAL-BG/DK and MESECAM BG/DK TV-standard.
The signals are recorded on tape according to the VHS-standard.
For information for repair, reference is made to the service manual of the VR3241/75.
(Code number 4822 726 14943)
For deviating parts, see enclosed parts list.

I.R.-Remote Control VR3241/95 Servicecodenumber : 4822 218 30616

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

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SPECIFICATIONS

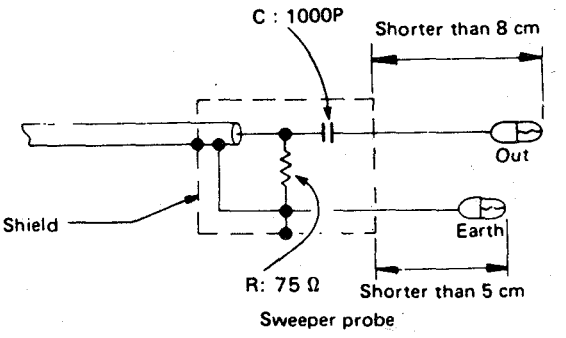
Format	: VHS PAL standard
Video recording system	: Two rotary head helical scan system
Video signal	: PAL colour and B&W signals 625 lines
	: ME SECAM colour and B&W signals 625 lines
Recording playing time	: 4 hours max with E240 tape (SP mode)
Tape width	: 12.7 mm
Tape speed	: 23.39 mm/sec
Antenna	: 75 Ω unbalanced
Receiving channel	: VHF E2 - E4 // E5 - E12 // S1 - S3
	M1 - M10 // U1 - U10
RF converter output signal	: UHF 21 - 69
Power requirement	: UHF 30 - 39 preset to 37
Power consumption	: 220 volts ± 10 % 50 Hz
Operating temperature	: Approx. 19 W
Operating humididty	: 5°C to 40 °C
Storage temperature	: 5 - 80 %
Weight	: -20°C to 55 ° C
Dimensions	: 5.0 Kg
	: 360 mm (W) x 330 mm (D) x 85 mm (H)
VIDEO	
Input	
Output	: 1.0 Vp-p, 75Ω
	: 1.0 Vp-p, 75Ω
AUDIO	
Input	0 dB = 0.775 Vrms
Output	: Line: - 8 dBs, > 47 KΩ
	: Line: - 8 dBs, < 47 KΩ
Accessories included	
	: Antenna 75 Ω coaxial connector cable (plug provided)
	Operating manual
	Infrared remote control
	Battery

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

Note :
The antenna must correspond to the new standard DIN 45325 (IEC 169-2) for combined UHF/VHF antenna with 75 ohm connector.

2.7 TUNER/IF CIRCUIT

Note: ***Unless otherwise specified, all test points and adjustments are located on the TUNER/IF board.***

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
Equipment required: 1. Oscilloscope 2. IF sweep signal generator with suitable markers (PIF, etc.) 3. Sweeper probe (sweep signal supply cable) as shown below.						 **Fig. 2-7-1**
1	VCO	• EE	•Tuner	•IC1-17	•T4	1) Use a sweeper probe as shown in Fig. 2-7-1 and connect the sweep generator output to pin 1 of SAW 1. Adjust the sweep gain so that the waveform does not distort as observed with the oscilloscope. Connect the oscilloscope to pin 17 of IC1 (VIDEO DET OUT) and adjust T4 to align the waveform with the frequency marker as shown in Fig. 2-7-2.
				38.9 MHz Marker VCO and sweep signal (beat) **Fig. 2-7-2**		
			•Tuner •TV broadcast	•TV monitor	•T4	**Alternate method:** 1) Receive a colour broadcast on a VHF-HI channel. 2) Adjust T4 to obtain a fine picture on the monitor.
• **Before the following adjustments:** 1. Connect a cable to ANT IN and terminate TV OUT at 75 Ω. 2. Set a TV channel signal generator as follows. Video: 65 dBμ/75 Ω, colour bar 87.5% modulation Audio: 55 dBμ/75 Ω, 1 kHz ± 50 kHz deviation						
2	RF AGC	• EE	•Tuner •TV broadcast	•TV monitor	•R40	1) Connect the oscilloscope to IF terminal of U/V Tuner (Front end). Adjust R40 for maximum level, then again adjust R40 for −8 dB again. **Alternate method:** **Note:** ***Adjust R40 (RF AGC) to correct for excess noise in the picture or when streaky cross interference occurs due to strong electrical fields.*** 1) Adjust R40 to minimize noise or streaks on the TV monitor. 2) Check for absence of abnormality on all channels.

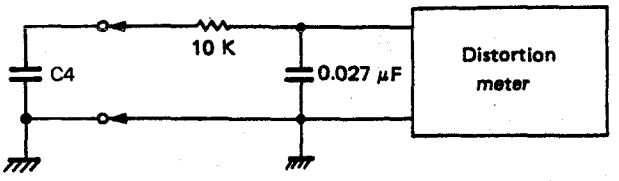
<table>
<tr><th>No.</th><th>Item</th><th>Mode</th><th>Signal & Setting</th><th>Measurement Point</th><th>Adjustment Parts</th><th>Adjustment Procedure</th></tr>
<tr><td>3</td><td>SOUND DET.</td><td>• EE</td><td>• Tuner
• TV broadcast</td><td>•Across C40 (Audio out) Main board</td><td>•T2 (Sound det)</td><td>1) Use a adjustment circuit as shown in Fig. 2-7-3. and with AFC mode to NORM, connect a distortion meter as shown in Fig. 2-7-3.
2) Adjust T2 for minimum distortion (less than 1.5%).</td></tr>
<tr><td colspan="6">Purpose:
Set for optimum audio level.
Maladjustment:
Audio level will either have a small sound or no sound.
 

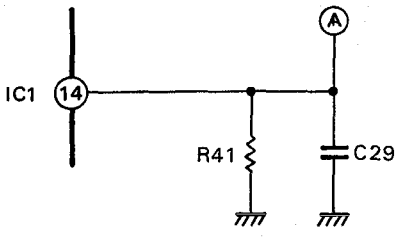
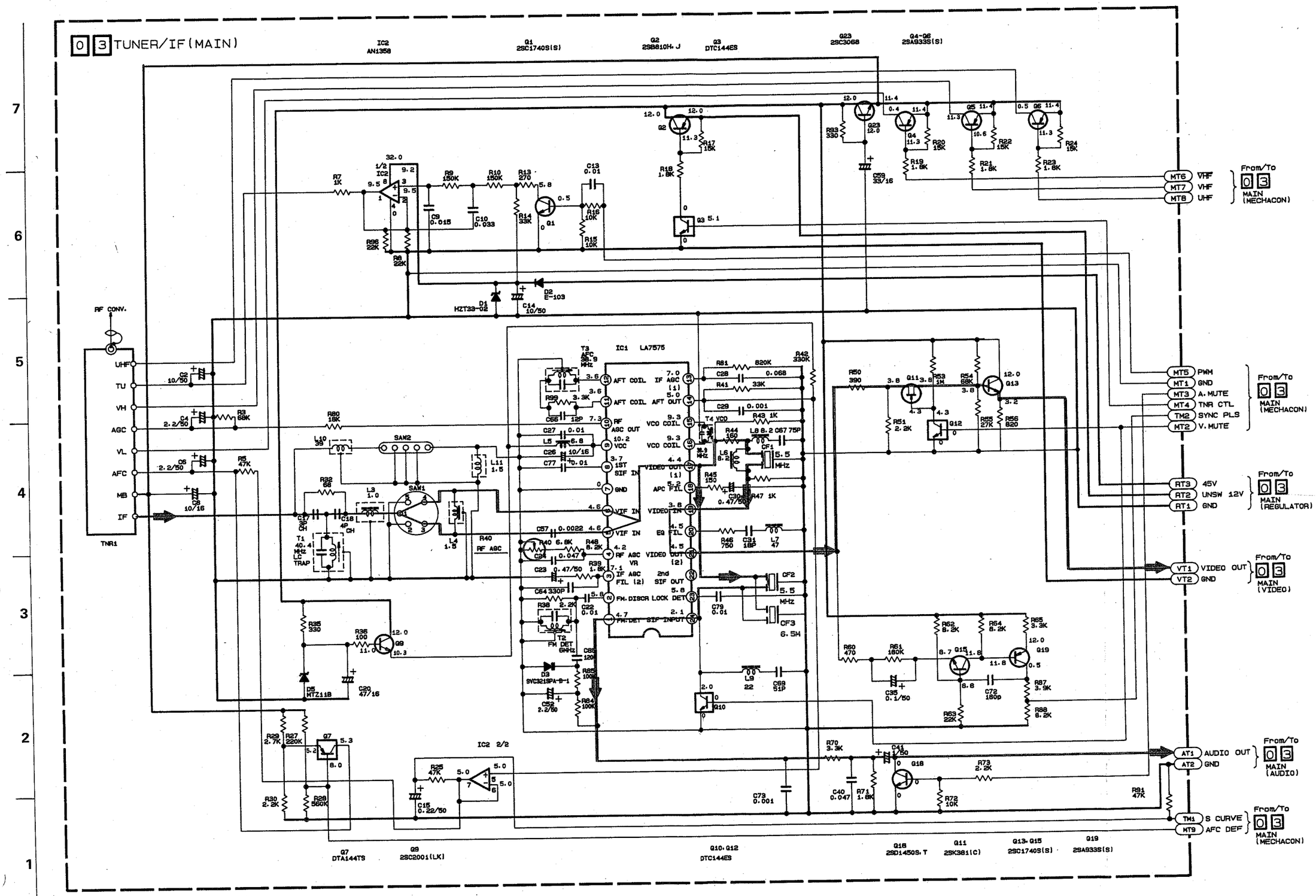
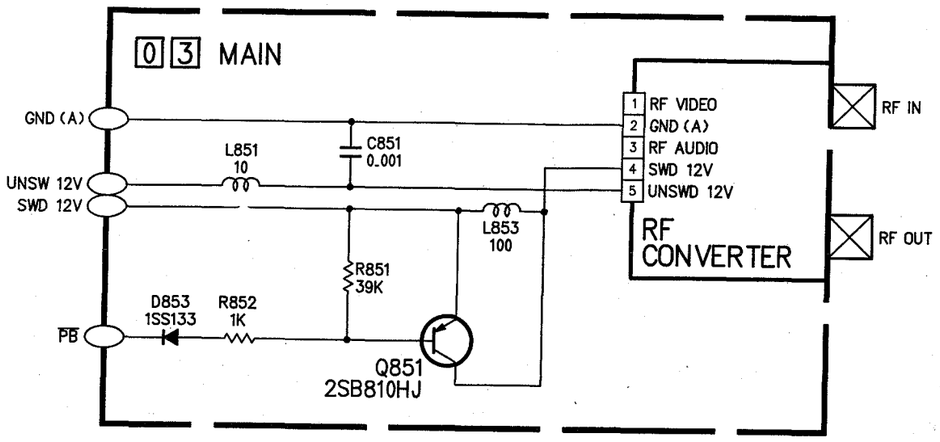
Fig. 2-7-3 Adjustment circuit</td></tr>
<tr><td></td><td></td><td></td><td></td><td>•Across C40 (Main board)</td><td></td><td>Alternate method:
1) Receive a color broadcast on a VHF-HI channel (7 to 13). Connect an oscilloscope to across C40 of the MAIN board.
2) Adjust T2 for maximum level at audio sound.</td></tr>
<tr><td>4</td><td>AFC</td><td>• EE</td><td>• Tuner
• TV broadcast
• AFC NORM by MENU</td><td>• A (Main board)</td><td>•T3 (AFC)</td><td>1) With AFC mode to NORM, connect oscilloscope to A of the MAIN board as shown in Fig. 2-7-4.
2) Set the oscilloscope to DC mode and adjust T2 to set the lower edge of the ripple waveform to 2.2 ± 0.2 V.</td></tr>
<tr><td colspan="6">Purpose:
Keep the local oscillator in the receiver from drifting off proper tuning. (Set for optimum broadcast colour signal)
Maladjustment:
The picture will eithar have a beat or smear. In some cases it may disappear.
 

Fig. 2-7-4 Adjustment point</td></tr>
<tr><td></td><td></td><td></td><td></td><td>• A (Main board)</td><td>•T3 (AFC)</td><td>Alternate method:
1) Receive a color broadcast on a VHF-HI channel (7 to 13).
2) With AFC mode to NORM, connect oscilloscope to A of the MAIN board as shown in Fig. 2-7-4.
3) Set the oscilloscope to DC mode and adjust T3 to set the lower edge of the ripple waveform to 2.2 ± 0.2 V.</td></tr>
</table>

3.16 TUNER/IF (MAIN) SCHEMATIC DIAGRAM

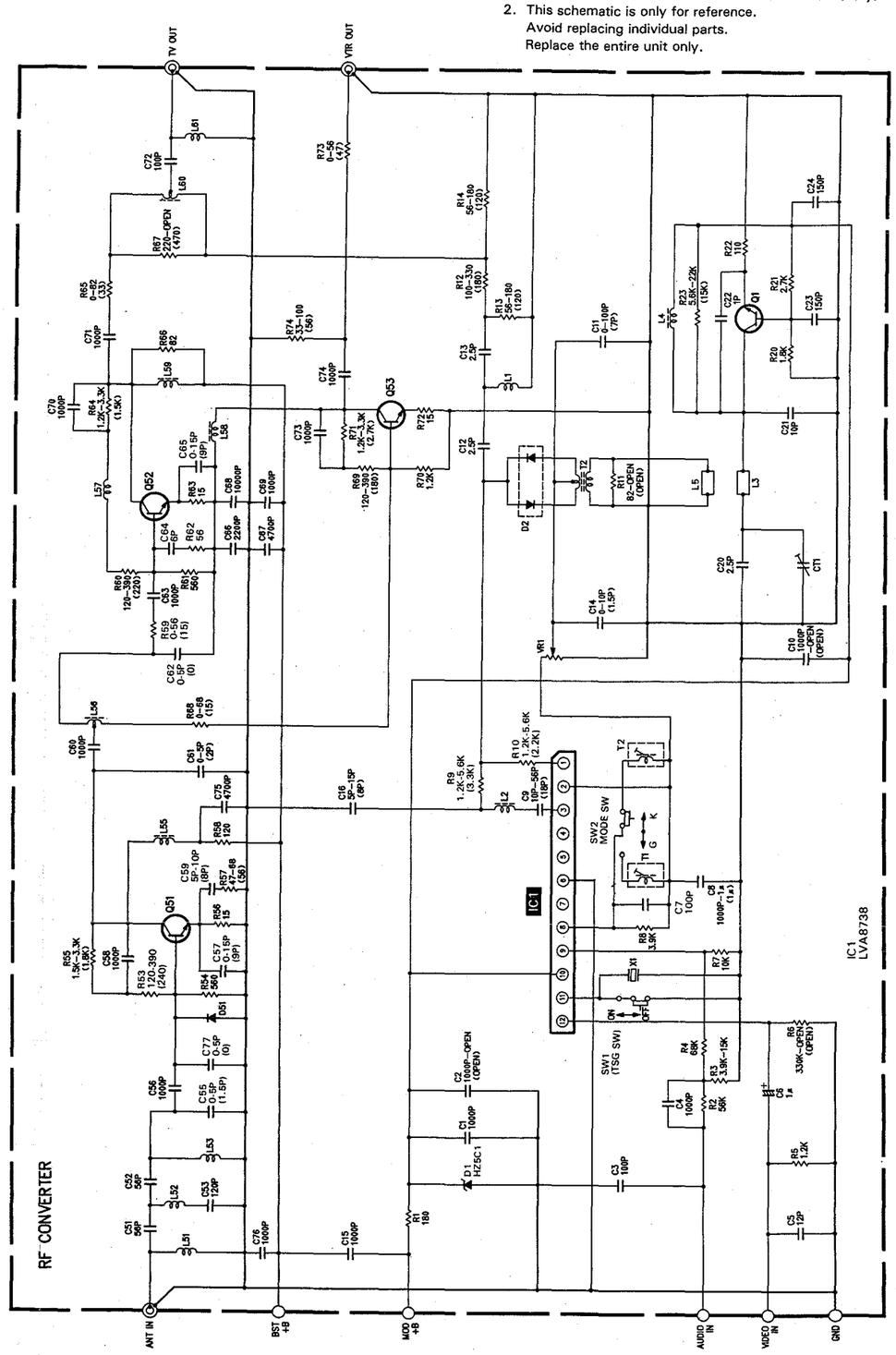


Terminal Schematic Diagram



3.30 RF CONVERTER SCHEMATIC DIAGRAM

Note:
1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
   Avoid replacing individual parts.
   Replace the entire unit only.



PARTSLIST OF VR3241/95

Miscellaneous

	4822 321 23308	RF cable
7	4822 138 10117	Battery
9	4822 736 52534	Instructions
14	4822 218 30616	Remote control

Cabinet assembly

1	4822 443 41061	Front panel assy
1a	4822 410 61453	Button(open.)
1b	4822 443 63388	Cassette door
1c	4822 242 80333	IR window
1d	4822 492 42565	Torsion spring
3	4822 443 30803	Top cover
4	4822 502 13813	Special screw
5	4822 502 13815	Special screw
6	4822 443 63391	Filter(fdp)
7	4822 466 40627	Foot
8	4822 443 51213	Bottom cover
9	4822 502 13817	Screw, for bottom

Chassis assembly

1	4822 464 50856	Bottom chassis
2	4822 691 20689	Drum assy
2c	4822 691 20688	Drum base assy
2d	4822 290 81443	Brush assy
2e	4822 502 13821	Screw
2f	4822 528 90822	Roller assy
3	4822 503 21013	Screw, for drum
4	4822 502 13814	Special screw
5	4822 528 90827	Inertia plate
6	4822 464 50859	Cassette housing ass
7	4822 502 13818	Screw,cass.Hous.
8	4822 502 13814	Special screw
9	4822 503 21007	Screw
10	4822 443 63389	Shield cover
11	4822 502 13811	Screw
12	4822 443 30804	Shield plate
13	4822 502 13818	Screw
15	4822 535 93246	Spacer

Mechanism assembly

1	4822 403 70442	Tension arm assy
1a	4822 492 33295	Tension spring
2	4822 401 11421	Tension band assy
3	4822 535 93247	Adjust pin
4	4822 249 40281	Full erase head
5	4822 502 13816	Screw
6	4822 528 90823	Roller
7	4822 462 71778	Guide pole
8	4822 249 10444	Audio/control head
9	4822 464 50858	Head base
10	4822 502 13812	Special screw
11	4822 492 52267	Compression spring
12	4822 502 30531	Screw
13	4822 502 13277	Screw
14	4822 464 50861	Pole base assy (t.U)
15	4822 464 50862	Pole base assy (supp)
16	4822 462 41851	Stopper
17	4822 462 41852	Stopper 2
18	4822 528 90824	Tape guide
19	4822 528 90825	Guide flange
20	4822 528 90826	Tape guard
21	4822 462 71778	Guide pole
22	4822 361 60503	Capstan motor
23	4822 502 12949	Screw
24	4822 522 33112	Idler gear unit
25	4822 502 30471	Screw
26	4822 522 33113	Clutch unit
27	4822 532 12105	Slit washer
28	4822 403 70443	Change lever assy
29	4822 358 31143	Belt
30	4822 528 81451	Reel disk (t.U)
31	4822 532 52355	Spacer
32	4822 403 70444	Loading arm assy (supp)
33	4822 403 70445	Loading arm assy (t.U.)
34	4822 361 21462	Mode motor assembly
35	4822 502 30471	Screw
36	4822 522 10449	Worm clutch assy
37	4822 358 31142	Belt
38	4822 522 33108	Control cam
39	4822 403 70446	Plate assy
40	4822 532 12103	Slit washer
41	4822 532 12105	Slit washer
42	4822 403 70447	Pinch roller arm assy
43	4822 403 70441	Pinch roller press
44	4822 492 33287	Tension spring
45	4822 532 12103	Slit washer
46	4822 522 33109	Pinch roller cam
47	4822 403 70448	Guide arm assy
48	4822 492 42564	Torsion spring
49	4822 522 33111	Half loading gear assy
50	4822 532 12104	Slit washer
51	4822 403 70449	Cancel lever assy
51a	4822 492 33293	Tension spring
51b	4822 492 33289	Tension spring
51c	4822 492 33294	Tension spring
52	4822 403 70451	Hook assy
52a	4822 492 33291	Tension spring
53	4822 403 70452	Main brake assy(supp)
54	4822 403 70453	Main brake assy(t.u)
55	4822 492 33292	Tension spring
56	4822 403 70454	Sub brake assy (t.u)
57	4822 492 33288	Tension spring
60	4822 255 41225	Led holder(incl.Led)
61	4822 276 13134	Rec safety switch
62	4822 277 21547	Slide switch(s3)
63	4822 502 13816	Screw
65	4822 502 13819	Screw
66	4822 502 13809	Screw
70	4822 528 81452	Reel disk (supply)
73	4822 403 70455	Tension band bracket
100	4822 464 50857	Main deck assy
100a	4822 492 70943	Earth plate
100b	4822 502 13828	Screw

Switching regulator board Assy

PWBA	4822 214 33431	Switching regulator
Transistor		
Q1	4822 130 61106	2SC4517A-LF619
Q2	4822 130 62794	2SC3616(MLK)
Q5	4822 130 60161	2SA933S(S)
Q6	4822 130 42483	2SC1740S(S)
Diode		
D1	4822 130 82698	10E6-F2
D2	4822 130 82698	10E6-F2
D3	4822 130 82698	10E6-F2
D4	4822 130 82698	10E6-F2
D5	4822 130 82686	AU01
D6	4822 130 82686	AU01
D7	4822 130 82687	AU01Z

D8	4822 130 82691	MTZ27BT-77
D21	4822 130 82687	AU01Z
D22	4822 130 82696	RL2Z-LFB2
D23	4822 130 82695	RK14LF-B2
D24	4822 130 82687	AU01Z
D25	4822 130 82687	AU01Z
D27	4822 130 82693	RD30ES-T1B1
D28	4822 130 82694	RD6.2ES-T1B1
D29	4822 130 82692	MTZ33A-77
D30	4822 130 81748	11ES2
Resistor		
R2	4822 111 92039	W.W, 2R2
R3	4822 116 83333	330K,1/6W
R4	4822 050 11004	100K,1/6W
R5	4822 116 83141	Oxide,100k,2W
R6	4822 116 83139	Oxide,68k,2W
R7	4822 116 83201	Metal,R47,1W
R8	4822 116 81543	820R,1/6W
R9	4822 050 11202	1K2,1/6W
R17	4822 116 83334	360K,1/6W
R21	4822 116 81729	470R,1/6W
R22	4822 116 81729	470R,1/6W
R23	4822 116 82086	680R,1/6W
R24	4822 116 83199	Metal,475r,1/4W
R24	4822 116 83198	Metal,432r,1/4W
R26	4822 116 81641	4K7,1/6W
R27	4822 116 83202	100R,fusible
R28	4822 116 83204	470R,fusible
C1	4822 121 33979	Mm,33nF
C3	4822 121 33979	Mm,33nF
C4	4822 126 11617	2.2nF
C5	4822 126 11617	2.2nF
C8	4822 126 11616	2.2nF
C9	4822 126 11616	2.2nF
C10	4822 126 11616	2.2nF
C11	4822 126 11616	2.2nF
C14	4822 124 23819	Elco,68µF
C15	4822 124 23161	Elco,2.2µF
C16	4822 126 11615	100pF
C17	4822 121 43973	MM,120nF
C18	4822 126 11599	270pF
C19	4822 121 43959	4n7
C20	4822 121 70008	5n6
C22	4822 124 11223	4.7nF
C31	4822 124 23856	Elco,22µF
C32	4822 124 23855	Elco,10µF
C33	4822 124 23834	Elco,680µF
C34	4822 124 23098	Elco,470µF
C35	4822 124 23872	Elco,680µF
C36	4822 124 23844	Elco,470µF
C37	4822 124 23853	Elco,22µF
C38	4822 124 23857	Elco,10µF
C39	4822 124 23871	Elco,120µF
C40	4822 124 23156	Elco,47µF
C41	4822 121 43958	10nF
C42	4822 121 43981	100nF
C43	4822 121 43958	10nF
Coil		
L1	4822 157 63407	33µH
L2	4822 157 63407	33µH
L3	4822 157 63559	3.3mH
PC1	4822 130 80603	Photo coupler
POC1	4822 321 10772	Power cord
T1	4822 148 81186	Sw trans
CI1	4822 492 42137	Fuse clip
HD1	4822 401 11312	Strain relief
LF1	4822 121 20261	Line filter
SCW1	4822 502 13826	Screw
SCW2	4822 502 13826	Screw
SCW3	4822 502 13825	Screw

SLD1	4822 466 62065	Shield case(1)
SLD2	4822 466 62066	Shield case(2)
CN1	4822 265 41134	Connector
CP1	4822 209 63611	Circuit protector
CP2	5322 157 53342	Circuit protector
CP3	4822 209 30296	Circuit protector
F1	4822 070 32002	Fuse

Main board assy

PWBA	4822 214 33439	Main board assy
RF1	4822 214 33442	Rf converter
ETH1	4822 403 70459	Earth plate
JA2	4822 264 30321	Pin jack, V in/out
JA3	4822 264 30319	Pin jack, A in/out
SCW1	4822 502 13827	Screw, for RF conver
SCW2	4822 502 13811	Screw
SPC1	4822 462 41855	Spacer
SPC2	4822 462 41854	Spacer
TB1	4822 214 33446	Terminal board

Tuner/IF section

TNR1	4822 210 10445	Tuner
Integrated circuit		
IC1	4822 209 30247	LA7575
IC2	4822 209 30246	AN1358
Transistor		
Q1	4822 130 42483	2SC1740S(S)
Q2	4822 130 62589	2SB810H,J
Q3	4822 130 42594	DTC144ES
Q4	4822 130 60161	2SA933S(S)
Q5	4822 130 60161	2SA933S(S)
Q6	4822 130 60161	2SA933S(S)
Q7	4822 130 61187	DTA144TS
Q9	4822 130 41651	2SC2001(LK)
Q10	4822 130 42594	DTC144ES
Q11	4822 130 62796	2SK381(C)
Q12	4822 130 42594	DTC144ES
Q13	4822 130 42483	2SC1740(S)
Q15	4822 130 42483	2SC1740S(S)
Q18	4822 130 61544	2SD1450S,T
Q19	4822 130 60161	2SA933S(S)
Q23	4822 130 62793	2SC3068
Diode		
D1	4822 130 82037	HZT33-02
D2	4822 130 82688	E-103
D3	4822 130 82772	SVC321SPA-B-1
D5	4822 130 82689	MTZ11B
Resistor		
R3	4822 116 83193	68K,1/10W
R5	4822 116 83165	220K,1/10W
R7	4822 116 83145	1K,1/10W
R8	4822 116 83164	22K,1/10W
R9	4822 116 83157	150K,1/10W
R10	4822 116 83157	150K,1/10W
R11	4822 116 83142	0R0,1/10W
R12	4822 116 83142	0R0,1/10W
R13	4822 116 83167	270 OHM 0.1W
R24	4822 116 83174	330R,1/10W
R14	4822 116 83176	33K,1/10W
R15	4822 116 83146	10K,1/10W
R16	4822 116 83146	10K,1/10W
R17	4822 116 83156	15K,1/10W
R18	4822 116 83159	1K8,1/10W
R19	4822 116 83159	1K8,1/10W
R20	4822 116 83156	15K,1/10W
R21	4822 116 83159	1K8,1/10W

R22	4822 116 83156	15K,1/10W
R23	4822 116 83159	1K8,1/10W
R24	4822 116 83156	15K,1/10W
R25	4822 116 83183	47K,1/10W
R26	4822 116 83142	0R0,1/10W
R27	4822 116 83165	220K,1/10W
R28	4822 116 83188	560K,1/10W
R29	4822 116 83168	2K7,1/10W
R30	4822 116 83163	2K2,1/10W
R32	4822 116 83344	68R,1/10W
R35	4822 116 83174	330R,1/10W
R36	4822 116 83144	100R,1/10W
R37	4822 116 83142	0R0,1/10W
R38	4822 116 83335	3K9,1/10W
R39	4822 116 83159	1K8,1/10W
R40	4822 100 11785	Potm.6K8,rf agc
R41	4822 116 83177	330K,1/10W
R42	4822 116 83177	330K,1/10W
R43	4822 116 83145	1K,1/10W
R44	4822 116 83154	150R,1/10W
R45	4822 116 83154	150R,1/10W
R46	4822 116 833345	750R,1/10W
R47	4822 116 83145	1K,1/10W
R48	4822 116 83196	8K2,1/10W
R50	4822 116 83178	390R,1/10W
R51	4822 116 83163	2K2,1/10W
R53	4822 116 83148	1M,1/10W
R54	4822 116 83193	68K,1/10W
R55	4822 116 83169	27K,1/10W
R56	4822 116 83195	820R,1/10W
R60	4822 116 83181	470R,1/10W
R61	4822 116 83162	180K,1/10W
R62	4822 116 83196	8K2,1/10W
R63	4822 116 83164	22K,1/10W
R64	4822 116 83196	8K2,1/10W
R65	4822 116 83175	3K3,1/10W
R70	4822 116 83168	2K7,1/10W
R71	4822 116 83159	1K8,1/10W
R72	4822 116 83146	10K,1/10W
R73	4822 116 83163	2K2,1/10W
R80	4822 116 83161	18K,1/10W
R81	4822 116 83197	820K,1/10W
R84	4822 116 83147	10K,1/10W
R85	4822 116 83147	10K,1/10W
R87	4822 116 83335	3K9,1/10W
R88	4822 116 83336	7K5,1/10W
R90	4822 116 83142	0R0,1/10W
R91	4822 116 83183	47K,1/10W
R93	4822 116 83174	330R,1/10W
R96	4822 116 83164	22K,1/10W
R99	4822 116 83175	3K3,1/10W
Capacitor		
C2	4822 124 23864	Elco,10µF
C4	4822 124 23866	2.2µF/50V
C6	4822 124 23866	2,2µF
C8	4822 124 23873	Elco,10µF
C9	4822 121 43963	15nF
C10	4822 121 43966	33nF
C13	4822 126 11611	10nF
C14	4822 124 23864	Elco,10µF
C15	4822 124 23865	Elco,0.22µF
C17	4822 126 11851	3pF
C18	4822 126 11852	4pF
C20	4822 124 23874	Elco,47µF
C22	4822 126 11611	10nF
C23	4822 124 23869	Elco,0.47µF
C24	4822 126 10489	47nF
C26	4822 124 23873	Elco,10µF
C27	4822 126 11611	10nF
C28	4822 121 43971	68nF
C29	4822 126 11612	1nF
C30	4822 124 23869	Elco,0.47µF
C31	4822 126 11606	18pF
C35	4822 124 42277	Elco,0.1µF
C40	4822 121 43969	47nF
C41	4822 124 23863	Elco,1µF
C52	4822 124 23866	2.2µF/50V
C57	4822 126 11613	2.2nF
C59	4822 124 23861	Elco,33µF
C64	4822 126 11614	330pF
C66	4822 126 11605	120pF
C67	4822 126 11607	180pF
C68	4822 116 83142	0R0,1/10W
C69	4822 126 11608	180pF
C70	4822 116 83142	0R0,1/10W
C71	4822 116 83142	0R0,1/10W
C72	4822 126 11837	82pF
C73	4822 126 11612	1nF
C75	4822 126 11838	150pF
C77	4822 116 83142	0R0
C78	4822 126 11611	10nF
C79	4822 126 11611	10nF
C85	4822 126 11849	120pF 16V
C87	4822 124 42247	Elco,100µF
C92	4822 126 11836	56pF
Coil		
L2	4822 157 63561	Coil
L3	4822 157 63562	1.2µH
L4	4822 157 63404	1.5µH
L5	4822 157 63401	6.8µH
L6	4822 157 63402	8.2µH
L7	4822 157 90199	820µH
L8	4822 157 63402	8.2µH
L9	4822 157 62377	22µH
L10	4822 157 63579	3.9µH
L11	4822 157 63404	1.5µH
L12	4822 157 90197	100µH
CF1	4822 242 80335	Cer.Filter
CF2	4822 242 80337	Cer.Filter
CF3	4822 242 80398	Cer.Filter
SAW1	4822 242 80388	Saw.Filter
SAW2	4822 242 80399	Saw.Filter
T1	4822 157 63576	Coil
T2	4822 148 81201	IF transformer
T3	4822 148 81198	IF transformer
T4	4822 148 81197	IF transformer

Video section

Integrated circuit		
IC280	4822 209 30415	BA7106LS
Transistor		
Q201	4822 130 42483	2SC1740S(RS)
Q202	4822 130 42483	2SC1740S(RS)
Q206	4822 130 42483	2SC1740S(RS)
Q207	4822 130 42483	2SC1740S(RS)
Q210	4822 130 60161	2SA933S(RS)
Q211	4822 130 60161	2SA933S(RS)
Q213	4822 130 42483	2SC1740S(RS)
Q214	4822 130 60161	2SA933S(RS)
Q217	4822 130 60591	DAT114ES
Diode		
D207	4822 130 32778	1SS133
D212	4822 130 32778	1SS133
D214	4822 130 32778	1SS133
D280	4822 130 32778	1SS133

Resistor

R201	4822 116 83145	1K,1/10W
R202	4822 116 83164	22K,1/10W
R203	4822 116 83164	22K,1/10W
R206	4822 116 83144	100R,1/10W
R208	4822 100 11782	Potm.3K3,pb freq.
R209	4822 116 83155	1K5,1/10W
R210	4822 116 83189	620R,1/10W
R211	4822 116 83176	33K,1/10W
R212	4822 116 83156	15K,1/10W
R213	4822 116 83163	2K2,1/10W
R214	4822 116 83191	680R,1/10W
R215	4822 100 11784	Potm.680R,rec col.
R216	4822 116 83156	15K,1/10W
R217	4822 116 83146	10K,1/10W
R218	4822 116 83145	1K,1/10W
R227	4822 050 13901	390R,1/2W
R229	4822 116 83151	12K,1/10W
R230	4822 116 83146	10K,1/10W
R240	4822 116 83167	270R,1/10W
R242	4822 116 83145	1K,1/10W
R243	4822 116 83145	1K,1/10W
R244	4822 116 83155	1K5,1/10W
R245	4822 116 83145	1K,1/10W
R246	4822 100 11781	Potm.2K2,rec fm
R247	4822 116 83155	1K5,1/10W
R248	4822 116 83163	2K2,1/10W
R249	4822 116 83191	680R,1/10W
R250	4822 116 83194	75R,1/10W
R241	4822 116 83194	75R,1/10W
R257	4822 116 83186	5K6,1/10W
R258	4822 116 83186	5K6,1/10W
R259	4822 116 83185	560R,1/10W
R262	4822 116 83175	3K3,1/10W
R264	4822 116 83174	330R,1/10W
R266	4822 116 83149	120R,1/10W
R267	4822 116 83187	5K6,1/10W
R281	4822 116 83191	680R,1/10W
R282	4822 116 83178	390R,1/10W
R283	4822 116 83147	10K,1/10W
R284	4822 116 83169	27K,1/10W
R285	4822 116 83146	1K,1/10W
R286	4822 116 83176	33K,1/10W

Capacitor

C201	4822 126 11601	10nF
C202	4822 126 11602	39pF
C203	4822 126 11601	10nF
C204	4822 126 11601	10nF
C205	4822 124 23825	Elco,47µF
C206	4822 126 11601	10nF
C207	4822 126 11601	10nF
C208	4822 126 11601	10nF
C209	4822 126 11601	10nF
C212	4822 124 42286	Elco,470µF
C213	4822 126 11601	10nF
C214	4822 124 23859	Elco,47µF
C215	4822 124 23841	Elco,1000µF
C216	4822 124 23859	Elco,47µF
C217	4822 126 11601	10nF
C222	4822 126 11601	10nF
C226	4822 126 11603	5pF
C228	4822 126 11601	10nF
C229	4822 126 11604	56pF
C280	4822 124 23826	1µF
C281	4822 124 23833	330n
C282	4822 126 11858	470pF
C284	4822 126 11601	10nF
C285	4822 126 11601	10nF
C286	4822 126 11601	10nF
C287	4822 126 11601	10nF
C288	4822 121 70009	470pF
C289	4822 126 11833	27pF
C290	4822 126 11654	4n7
C291	4822 126 11603	5pF
C293	4822 124 42276	470µF
C294	4822 126 11601	10nF
C295	4822 126 11832	100pF

Coil

L201	4822 157 60104	100µH
L202	4822 157 62375	18µH
L203	4822 157 63558	220µH
L204	4822 157 60104	100µH
L206	4822 157 62373	120µH
L280	4822 157 60104	100µH
L282	4822 157 63582	Coil

EQ20	4822 218 30609	Equalizer
CN20	4822 265 41142	Connector

Audio section

Integrated circuit

IC30	4822 209 73482	BA7765AS

Transistor

Q301	4822 130 42483	2SC1740S(RS)
Q302	4822 130 42483	2SC1740S(RS)
Q303	4822 130 42683	DTC144ES
Q304	4822 130 60161	2SA933S(RS)
Q305	4822 130 42682	DTA144ES
Q306	4822 130 42483	2SC1740S(RS)

Diode

D301	4822 130 32778	1SS133

Resistor

R301	4822 116 83156	15K,1/10W
R302	4822 116 83163	2K2,1/10W
R303	4822 116 83183	47K,1/10W
R304	4822 116 83172	3K,1/10W
R305	4822 116 83146	10K,1/10W
R306	4822 116 83168	2K7,1/10W
R307	4822 116 83145	1K,1/10W
R308	4822 116 83163	2K2,1/10W
R310	4822 116 83164	22K,1/10W
R311	4822 116 83167	270R,1/10W
R312	4822 116 83171	270K,1/10W
R313	4822 116 83146	10K,1/10W
R315	4822 116 83146	10K,1/10W
R316	4822 116 83164	22K,1/10W
R317	4822 116 83184	4M7,1/10W
R318	4822 116 83151	12K,1/10W
R319	4822 116 83176	33K,1/10W
R320	4822 116 83195	820R,1/10W
R321	4822 116 83189	620R,1/10W
R322	4822 116 83185	560R,1/10W
R323	4822 116 83164	22K,1/10W
R324	4822 116 83173	30K,1/10W
R325	4822 116 83154	150R,1/10W
R326	4822 116 83168	2K7,1/10W
R327	4822 116 83173	30K,1/10W
R328	4822 116 83164	22K,1/10W
R330	4822 116 83146	10K,1/10W
R331	4822 116 83193	68K,1/10W
R332	4822 116 83186	5K6,1/10W
R333	4822 116 83153	13K,1/10W
R334	4822 116 83176	33K,1/10W
R335	4822 116 83179	4R7,1/10W
R336	4822 116 83149	120R,1/10W
R337	4822 116 83143	10R,1/10W
R338	4822 116 83203	Fusible,4R7

Capacitor

C301	4822 126 11651	1.2nF
C303	4822 124 23822	Elco,1μF
C304	4822 124 23826	Elco,10μF
C305	4822 126 11649	12nF
C306	4822 124 23832	Elco,1μF
C309	4822 124 23827	Elco,22μF
C310	4822 126 11633	100nF
C312	4822 124 23828	Elco,33μF
C313	4822 124 23831	Elco,100μF
C314	4822 124 23832	Elco,1μF
C315	4822 126 11649	12nF
C317	4822 124 23833	Elco,3.3μF
C318	4822 126 11646	330pF
C319	4822 121 43978	82nF
C320	4822 124 23862	Elco4.7μF
C321	4822 126 11654	4.7nF
C322	4822 126 11648	22nF
C323	4822 126 11635	82nF

Coil

L302	4822 157 63399	12mH
L303	4822 157 63397	470μH
T301	4822 148 81187	Osc transformer
CN30	4822 265 30909	Connector
CN30	4822 265 20527	Connector

Servo section

Integrated circuit

IC40	4822 209 80587	BU2829S
IC45	4822 209 30234	LM324N

Diode

D401	4822 130 32778	1SS133
D402	4822 130 32778	1SS133
D403	4822 130 32778	1SS133
D404	4822 130 32778	1SS133
D405	4822 130 32778	1SS133
D406	4822 130 80337	MTZ5.1B
D409	4822 130 32778	1SS133

Resistor

R401	4822 116 83183	47K,1/10W
R402	4822 100 11786	Potm.680K,hsw.Point
R403	4822 116 83145	1K,1/10W
R404	4822 116 83183	47K,1/10W
R405	4822 116 83183	47K,1/10W
R406	4822 116 83183	47K,1/10W
R407	4822 116 83183	47K,1/10W
R408	4822 116 83183	47K,1/10W
R409	4822 116 83183	47K,1/10W
R410	4822 116 83183	47K,1/10W
R411	4822 116 83183	47K,1/10W
R412	4822 116 83148	1M,1/10W
R413	4822 116 83169	27K,1/10W
R414	4822 116 83182	27K,1/10W
R415	4822 116 83182	27K,1/10W
R416	4822 116 83147	100K,1/10W
R417	4822 116 83151	12K,1/10W
R418	4822 116 83166	2M2,1/10W
R419	4822 116 83187	56K,1/10W
R420	4822 116 83164	22K,1/10W
R421	4822 116 83163	2K2,1/10W
R422	4822 116 83145	1K,1/10W
R423	4822 116 83145	1K,1/10W
R424	4822 116 83154	150R,1/10W
R425	4822 116 83146	10K,1/10W
R426	4822 116 83176	33K,1/10W
R429	4822 116 83223	3M3,1/10W
R430	4822 116 83177	330K,1/10W
R431	4822 116 83175	3K3,1/10W
R433	4822 116 83148	1M,1/10W
R434	4822 116 83169	27K,1/10W
R439	4822 101 21168	Potm,10k
R440	4822 116 83145	1K,1/10W
R451	4822 116 83145	1K,1/10W
R452	4822 116 83163	2K2,1/10W
R453	4822 116 83168	2K7,1/10W
R458	4822 116 83152	120K,1/10W

Capacitor

C401	4822 121 43355	6.8nF
C402	4822 126 11612	1nF
C403	4822 121 43352	4.7nF
C404	4822 121 43352	4.7nF
C405	4822 121 43353	47nF
C406	4822 121 43353	47nF
C407	4822 121 43965	2.2nF
C408	4822 121 43965	2.2nF
C409	4822 121 43961	47nF
C410	4822 121 43961	47nF
C411	4822 124 23862	Elco,4.7μF
C412	4822 124 23862	Elco,4.7μF
C413	4822 126 11652	220pF
C414	4822 121 43964	1.8nF
C415	4822 121 43975	270nF
C416	4822 126 11653	3.3nF
C417	4822 126 11612	1nF
C418	4822 124 23873	Elco,10μF
C419	4822 121 43353	47nF
C420	4822 124 23873	Elco,10μF
C421	4822 124 23874	Elco,47μF
C422	4822 126 11612	1nF
C423	4822 126 11612	1nF
C424	4822 124 23858	Elco,22μF
C425	4822 121 43968	82nF
C426	4822 121 43962	820nF
C427	4822 124 23826	Elco,10μF
C428	4822 124 23826	Elco,10μF
C429	4822 121 43967	56nF
C452	4822 126 11611	10nF
C454	4822 121 43347	100nF
C455	4822 126 11611	10nF
C456	4822 121 43347	100nF
C457	4822 126 11611	10nF
C458	4822 124 23858	Elco,22μF
C459	4822 126 11611	10nF

Coil

L451	4822 157 90157	27μH
CN40	4822 265 30909	Connector
CN40	4822 265 30911	Connector
CP40	4822 252 20172	Circuit protector

Mechacon section

Integrated circuit

IC60	4822 209 30242	M37417M4-133SP
IC60	4822 209 30236	CAT93C46P

Transistor

Q601	4822 130 42683	DTC124ES
Q602	4822 130 42683	DTC124ES

Diode

D601	4822 130 82704	MTZ7.5B
D602	4822 130 32778	1SS133
D603	4822 130 32778	1SS133
D604	4822 130 32778	1SS133
D605	4822 130 32778	1SS133
D606	4822 130 32778	1SS133
D607	4822 130 32778	1SS133
D608	4822 130 32778	1SS133

Resistor

R601	4822 116 83182	27K,1/10W
R603	4822 116 83145	1K,1/10W
R605	4822 116 83146	10K,1/10W
R606	4822 116 83182	27K,1/10W
R607	4822 116 83181	470R,1/10W
R608	4822 116 83176	33K,1/10W
R610	4822 116 83146	10K,1/10W
R611	4822 116 83145	1K,1/10W
R612	4822 116 83182	27K,1/10W
R613	4822 116 83145	1K,1/10W
R614	4822 116 83145	1K,1/10W
R615	4822 116 83182	27K,1/10W
R616	4822 116 83182	27K,1/10W
R617	4822 116 83182	27K,1/10W
R618	4822 116 83182	27K,1/10W
R619	4822 116 83178	390R,1/10W
R620	4822 116 83182	27K,1/10W
R621	4822 116 83146	10K,1/10W
R622	4822 116 83182	27K,1/10W
R623	4822 116 83182	27K,1/10W
R624	4822 116 83157	150K,1/10W
R626	4822 116 83187	56K,1/10W
R629	4822 116 83196	8K2,1/10W
R630	4822 116 83182	27K,1/10W
R631	4822 116 83182	27K,1/10W
R632	4822 116 83182	27K,1/10W
R633	4822 116 83176	33K,1/10W
R634	4822 116 83182	27K,1/10W
R635	4822 116 83146	10K,1/10W
R636	4822 116 83182	27K,1/10W
R638	4822 116 83182	27K,1/10W
R639	4822 116 83191	680R,1/10W
R640	4822 116 83148	1M,1/10W
R641	4822 116 83146	10K,1/10W
R654	4822 116 83182	27K,1/10W
R655	4822 116 83146	10K,1/10W
R656	4822 116 83146	10K,1/10W
R657	4822 116 83146	10K,1/10W

Capacitor

C601	4822 124 23832	Elco,1μF
C602	4822 124 23824	Elco,100μF
C603	4822 124 23829	Elco,3.3μF
C604	4822 126 11636	22nF
C605	4822 126 11634	47nF
C607	4822 126 11645	22pF
C608	4822 124 42285	Elco100μF
C610	4822 126 11632	100nF
C611	4822 126 11639	120pF

Coil

L601	4822 157 60104	100μH
Cf60	4822 242 80342	Resonator
TH80	4822 111 91712	Positive thermistor
CN60	4822 403 70457	Wire trap
CN60	4822 265 30912	Connector
CP601	4822 209 63611	Circuit prot.

Regulator section

Transistor

Q801	4822 130 62799	2SB1068(KU)
Q802	4822 130 62801	2SD2166(QRS)
Q803	4822 130 42483	2SC1740S

Diode

D854	4822 130 32778	1SS133
D855	4822 130 32778	1SS133

Resistor

R801	4822 116 81636	10K,1/6W
R802	4822 116 81542	2K2,1/6W
R803	4822 050 11202	1K2,1/6W
R805	4822 116 81641	4K7,1/6W
R806	4822 116 81729	470R,1/6W
R807	4822 050 11202	1K2,1/6W
R808	4822 116 81695	560R,1/6W
R809	4822 100 11783	Potm.470R,swd 5v

Capacitor

C801	4822 124 23859	Elco,47μF
C802	4822 126 11647	10nF
C803	4822 124 23859	Elco,47μF
C804	4822 124 23838	Elco,470μF
C851	4822 126 11689	1nF

Coil

L801	4822 157 60104	100μH
L851	4822 157 62372	10μH
L853	4822 157 90197	100μH
CN80	4822 265 41141	Connector
CN80	4822 403 70458	Wire trap
CP85	4822 252 20186	Circuit protector
S1	4822 277 21556	Slide switch

Pre/Rec. amp. board assy

PWBA	4822 214 33381	Pre/rec amp board as
PWBA	4822 214 33384	Extension board assy

Integrated circuit

IC70	4822 209 30241	LA7375

Transistor

Q701	4822 130 60088	2SA1309(RS)
Q702	4822 130 42483	2SC1740S(RS)
Q704	4822 130 42483	2SC1740S(RS)

Diode

D702	4822 130 32778	1SS133

Resistor

R702	4822 116 81695	560R,1/6W
R703	4822 116 81542	2K2,1/6W
R704	4822 116 81542	2K2,1/6W
R705	4822 116 81639	390R,1/6W
R706	4822 116 81639	390R,1/6W
R707	4822 116 81543	820R,1/6W
R708	4822 116 81727	3K3,1/6W
R709	4822 116 81537	1K5,1/6W
R710	4822 110 30962	620R,1/6W
R711	4822 111 30961	1K3,1/6W
R712	4822 116 81543	820R,1/6W
R713	4822 116 82086	680R,1/6W
R716	4822 050 11202	1K2,1/6W
R717	4822 116 81538	15K,1/6W
R718	4822 116 81637	22K,1/6W
R719	4822 116 81638	33K,1/6W
R720	4822 11130964	1K,1/6W
R721	4822 116 81638	33K,1/6W
R722	4822 111 30963	6K2,1/6W
R723	4822 116 81536	1K,1/6W
R724	4822 050 11203	12K,1/6W
R725	4822 050 16802	6K8,1/6W
R728	4822 116 81543	820R,1/6W

Capacitor

C702	4822 126 11647	10nF
C703	4822 126 11643	33pF
C704	4822 126 11647	10nF
C705	4822 126 11644	56pF
C706	4822 126 11641	10pF
C707	4822 126 10425	470pF
C709	4822 124 23821	Elco10μF
C710	4822 126 11647	10nF
C711	4822 126 11647	10nF
C714	4822 121 43977	82nF
C715	4822 126 11647	10nF
C716	4822 121 43974	220nF
C717	4822 121 43974	220nF

C718	4822 126 11647	10nF
C719	4822 126 11647	10nF
C720	4822 126 11689	1nF
C724	4822 126 11629	1nF
C726	4822 126 11647	10nF
C728	4822 124 11224	Elco,4.7μF
C729	4822 126 11641	10pF
C730	4822 124 23837	Elco,47μF
C732	4822 1126 11599	270pF
Coil		
L703	4822 157 62378	47μH
L704	4822 157 62378	47μH
L705	4822 153 10397	33μH
L706	4822 157 62373	120μH
L707	4822 157 60104	100μH
L710	4822 157 60104	100μH
SLD1	4822 466 62067	Shield case
TP70	4822 265 20526	Connector
CN1	4822 265 41136	Pin header, (extensi
CN2	4822 267 51109	Connector, (extensio
CN70	4822 265 41138	Connector

Video unit board

PWBA	4822 214 33429	Video unit board assy
SLD1	4822 466 62069	Shield plate
SLD2	4822 466 62068	Shield case
Integrated circuit		
IC1	4822 209 30239	JCP0016-2
IC2	4822 209 30243	TL8827P
Transistor		
Q1	4822 130 60862	2SA1576(QRS)
Q5	4822 130 60862	2SA1576(QRS)
Q10	4822 130 60669	2SC4081(QRS)
Q11	4822 130 60997	DTC144WU
Q12	4822 130 60997	DTC144WU
Q13	4822 130 60997	DTC144WU
Q14	4822 130 60997	DTYC144WU
Q16	4822 130 60997	DTC144WU
Q18	4822 130 60669	2SC4081(QRS)
Q19	4822 130 60669	2SC4081(QRS)
Q20	4822 130 60669	2SC4081(QRS)
Q21	4822 130 60862	2SA1576(QRS)
Q22	4822 130 60862	2SA1576(QRS)
Q23	4822 130 60997	DTC144WU
Q24	4822 130 60862	2SA1576(QRS)
Q25	4822 130 60669	2SC4081(QRS)
Q26	4822 130 60669	2SC4081(QRS)
Q28	4822 130 60669	2SC4081(QRS)
Q29	4822 130 60669	2SC4081(QRS)
Q30	4822 130 60669	2SC40819(QRS)
Q31	4822 130 60854	DTA124EU
Q32	4822 130 62797	DTC144WS
Diode		
D1	4822 130 82708	1SS292Y
D3	4822 130 32778	1SS133
D4	4822 130 32778	1SS133
D5	4822 130 32778	1SS133
D6	4822 130 32778	1SS133
D7	4822 130 80375	DAN202U
D10	4822 130 32778	1SS133
D11	4822 130 32778	1SS133
D12	4822 130 32778	1SS133
D14	4822 130 32778	1SS133
D15	4822 130 32778	1SS133
D17	4822 130 80375	DAN202U
D19	4822 130 32778	1SS133
D20	4822 130 32778	1SS133
D202	4822 130 80375	DAN202U

Resistor		
R1	4822 116 81525	Chip,680R
R2	4822 116 82172	Chip,4M7
R3	4822 116 82172	Chip,4M7
R5	4822 116 81483	Chip,1K3
R6	4822 116 83134	360R,1/10W
R10	4822 116 81482	Chip,1K
R11	4822 116 81525	Chip,680R
R12	4822 116 83128	1K,1/10W
R13	4822 116 81482	1K,1/6W
R16	4822 116 81511	Chip,3k9
R17	4822 101 11152	Trimmer 2K2
R18	4822 116 81508	Chip,33k
R19	4822 116 81535	Chip,82k
R21	4822 116 81506	Chip,330r
R22	4822 116 83138	620R,1/10W
R23	4822 116 81519	Chip,560r
R24	4822 116 81493	Chip,1k8
R25	4822 116 81497	Chip,2k2
R26	4822 116 81482	Chip,1k
R27	4822 116 81494	Chip,18k
R28	4822 116 81534	Chip,8k2
R29	4822 116 81521	Chip,5k6
R30	4822 116 81521	Chip,5k6
R31	4822 116 81494	Chip,18k
R32	4822 116 81521	Chip,5k6
R33	4822 116 81521	Chip,5k6
R35	4822 116 81507	Chip,3k3
R36	4822 116 81521	Chip,5k6
R37	4822 116 81507	Chip,3k3
R38	4822 116 81507	Chip,3k3
R40	4822 116 81482	Chip,1k
R41	4822 100 11777	Potm.Carrier
R42	4822 115 50208	Potm.Deviation
R43	4822 116 81497	Chip,2k2
R44	4822 116 83136	4K3,1/10W
R45	4822 116 81485	Chip,1k2
R46	4822 116 83135	360R,1/10W
R47	4822 116 81483	Chip,1k3
R48	4822 116 81476	Chip,1k
R49	4822 116 81483	Chip,1k3
R51	4822 116 81482	Chip,1k
R52	4822 116 81482	Chip,1k
R53	4822 116 81482	Chip,1k
R54	4822 116 81501	Chip,2k4
R55	4822 116 81511	Chip,3k9
R56	4822 100 11778	Potm.N.C ball.
R57	4822 116 81482	Chip,1k
R58	4822 116 81533	Chip,820r
R59	4822 116 81482	Chip,1k
R60	4822 100 11779	Potm.Ee level
R61	4822 116 81482	Chip,1k
R62	4822 116 82169	Chip,330k
R63	4822 116 81482	Chip,1k
R64	4822 101 30679	Potm.White clip
R65	4822 116 81483	Chip,1k3
R66	4822 116 83137	560K,1/10W
R67	4822 116 81482	Chip,1k
R68	4822 116 81482	Chip,1k
R69	4822 116 81482	Chip,1k
R70	4822 116 81514	Chip,470r
R71	4822 116 81485	Chip,1k2
R72	4822 116 81508	Chip,33k
R73	4822 116 81508	Chip,33k
R74	4822 116 81525	Chip,680r
R75	4822 116 81519	Chip,560r
R76	4822 116 81482	Chip,1k
R77	4822 116 81521	Chip,5k6
R78	4822 116 81525	Chip,680r
R79	4822 116 81497	Chip,2k2

R81	4822 116 82172	Chip,4m7
R83	4822 116 81503	Chip,2k7
R84	4822 116 81484	Chip,1m
R85	4822 116 81866	Chip,1m5
R208	4822 051 30472	Chip,4K7
Capacitor		
C1	4822 126 10027	Chip,220pF
C2	4822 126 10026	Chip,22pF
C4	4822 126 11626	Chip,560pF
C8	4822 126 11619	Chip,47nF
C9	4822 126 10023	Chip,15pF
C11	4822 126 10034	Chip,68pF
C12	4822 126 10026	Chip,22pF
C13	4822 126 11622	Chip,120pF
C14	4822 126 11621	Chip,10nF
C16	4822 126 11621	Chip,10nF
C17	4822 126 11621	Chip,10nF
C18	4822 122 33991	Chip,82pF
C19	4822 124 23854	Elco,0.47µF
C20	4822 126 11621	Chip,10nF
C21	4822 124 23854	Elco,0.47µF
C22	4822 124 23848	Elco,4.7µF
C23	4822 124 23286	Elco,10µF
C24	4822 124 23835	Elco,22µF
C25	4822 124 23286	Elco,10µF
C26	4822 124 23842	Elco,330µF
C27	4822 126 11621	Chip,10nF
C29	4822 126 11621	Chip,10nF
C30	4822 124 23852	Elco,2.2µF
C31	4822 124 23854	Elco,0.47µF
C32	4822 126 11624	Chip,200pF
C33	4822 126 11393	Chip,22nF
C34	4822 124 23848	Elco,4.7µF
C35	4822 126 11623	Chip,15pF
C36	4822 124 23287	Elco,1µF
C37	4822 126 11393	Chip,22nF
C38	4822 122 33986	Chip,100pF
C40	4822 122 33988	Chip,39pF
C41	4822 126 10055	Chip,100nF
C42	4822 124 23843	Elco,47µF
C43	4822 124 23286	Elco,10µF
C44	4822 126 11621	Chip,10nF
C45	4822 124 23286	Elco,10µF
C46	4822 126 11621	Chip,10nF
C47	4822 124 23287	Elco,1µF
C48	4822 126 11621	Chip,10nF
C49	4822 122 90058	4.7nF
C50	4822 126 11621	Chip,10nF
C51	4822 126 11621	Chip,10nF
C52	4822 124 23287	Elco,1µF
C53	4822 124 23286	Elco,10µF
C54	4822 126 11621	Chip,10nF
C56	4822 124 23836	Elco,4.7µF
C57	4822 124 23847	Elco,3.3µF
C58	4822 124 23848	Elco,4.7µF
C59	4822 126 11619	Chip,47nF
C60	4822 126 11621	Chip,10nF
C61	4822 124 23854	Elco,0.47µF
C62	4822 126 11618	Chip,33nF
C63	4822 126 11621	Chip,10nF
C64	4822 124 23849	Elco,0.1µF
C65	4822 126 11621	Chip,10nF
C66	4822 124 23849	Elco,0.1µF
C67	4822 126 11619	Chip,47nF
C69	4822 126 11621	Chip,10nF
C70	4822 126 11619	Chip,47nF
C71	4822 122 90053	2.7nF
C72	4822 124 23848	Elco,4.7µF
C73	4822 124 23287	Elco,1µF
C74	4822 124 23839	Elco,10µF
C75	4822 126 11621	Chip,10nF
C76	4822 126 11621	Chip,10nF
C77	4822 124 23849	Elco,0.1µF
C78	4822 126 11647	10nF
C79	4822 126 11621	Chip,10nF
C80	4822 126 11627	Chip,24pF
C82	4822 124 23852	Elco,2.2µF
C84	4822 126 10025	Chip,18pF
C91	4822 126 11628	Chip,62pF
C93	4822 126 11621	Chip,10nF
C95	4822 126 10021	Chip,12pF
C96	4822 126 11621	Chip,10nF
C97	4822 121 70007	33nF
C98	4822 126 10015	Chip,1nF
C99	4822 126 10025	Chip,18pF
C100	4822 126 11625	Chip,360pF
C102	4822 121 43972	100nF
Coil		
L1	4822 157 62373	120µH
L3	4822 153 10397	33µH
L4	4822 153 10397	33µH
L5	4822 153 10397	33µH
L6	4822 157 90199	82µH
L7	4822 157 60066	220µH
L8	4822 157 60104	100µH
L9	4822 157 60104	100µH
L10	4822 157 62381	68µH
L11	4822 157 60104	100µH
L12	4822 157 60104	100µH
L13	4822 157 63398	560µH
L14	4822 157 63396	2.2mH
L15	4822 157 62374	15µH
L16	4822 157 90199	82µH
LPF1	4822 157 63392	L.P.Filter
LPF2	4822 157 63393	L.P.Filter
LPF3	4822 157 63405	L.P.Filter
DL1	4822 157 63406	Comb filter
X1	4822 242 80339	Xtal resonator
CN1	4822 265 41135	Pin header
CN2	4822 265 41135	Pin header
CN3	4822 265 41135	Pin header

Audio/Controlhead board

PWB1	4822 214 33379	Audio/control head A
TRAP	4822 403 70461	Wire trap
CN1	4822 265 41139	Connector

Timer/Display/SW board

PWBA	4822 214 33383	Timer/display/sw.
Integrated circuit		
IC1	4822 209 30244	UPD75212ACW-270
IC2	4822 209 30238	IC-PST523H-2
IC10	4822 209 30237	IR detect unit
Transistor		
Q1	4822 130 42483	2SC1740S(RS)
Diode		
D1	4822 130 80793	RD9.1ES-T1B2
D2	4822 130 32778	1SS133
D3	4822 130 32778	1SS133
D4	4822 130 81748	11ES2
D5	4822 130 81748	11ES2
D6	4822 130 80604	RD10ESB2
D7	4822 130 32778	1SS133
D111	4822 130 80589	1SS132
D112	4822 130 80589	1SS132
D124	4822 130 80589	1SS132
D128	4822 130 80589	1SS132

Resistor		
R1	4822 116 81636	10K,1/6W
R2	4822 116 81641	4K7,1/6W
R3	4822 050 12703	6K8,1/6W
R4	4822 050 16802	6K8,1/6W
R5	4822 116 81638	33K,1/6W
R6	4822 116 81638	33K,1/6W
R7	4822 116 81536	1K,1/6W
R8	4822 116 81636	10K,1/6W
R9	4822 116 81636	10K,1/6W
R10	4822 116 81636	10K,1/6W
R11	4822 116 81636	10K,1/6W
R12	4822 116 81638	33K,1/6W
R13	4822 116 82083	270R,1/6W
R14	4822 116 82083	270R,1/6W
R15	4822 116 81636	10K,1/6W
R16	4822 116 81636	10K,1/6W
R17	4822 116 81641	4K7,1/6W
R18	4822 116 81638	33K,1/6W
R19	4822 116 81638	33K,1/6W
R20	4822 116 81638	33K,1/6W
R21	4822 116 81638	33K,1/6W
R22	4822 116 82083	270R,1/6W
R23	4822 116 82083	270R,1/6W
R24	4822 111 50565	220K,1/6W
R25	4822 116 81636	10K,1/6W
R26	4822 116 81636	10K,1/6W
R28	4822 116 81638	33K,1/6W
RA1	4822 111 92038	Res. Array
Capacitor		
C1	4822 124 23286	Elco,10μF
C2	4822 126 11647	10nF
C3	4822 126 11647	10nF
C4	4822 124 23286	Elco,10μF
C5	4822 124 23823	Elco0.47μF
C6	4822 125 60175	Trimmer
C7	4822 126 11642	12pF
C8	4822 124 23839	Elco,100μF
C9	4822 124 23851	Elco,10μF
C10	4822 124 23286	Elco,1μF
C11	4822 126 10419	100pF
C12	4822 126 10419	100pF
C13	4822 126 11638	47nF
C14	4822 126 11647	10nF
X1	4822 242 80341	Xtal (m)
S1	4822 276 13136	Tact switch, power
S2	4822 276 13136	Tact switch, stop
S3	4822 276 13136	Tact switch, FF
S4	4822 276 13136	Tact switch, rew
S5	4822 276 13136	Tact switch, ch+
S6	4822 276 13136	Tact switch, rec
S7	4822 276 13136	Tact switch, play
S8	4822 276 13136	Tact switch, ch-
FDP1	4822 130 91018	Fluorescent display
HD1	4822 256 91795	FDP holder(r)
HD2	4822 256 91794	FDP holder(l)
CN1	4822 403 70458	Wire trap

Deck terminal board

PWBA	4822 214 33376	Deck terminal board
Transistor		
Q1	4822 130 82706	End sensor
Resistor		
R1	4822 116 81536	1K,1/6W
R3	4822 116 82084	330R,1/6W
R4	4822 116 82084	330R,1/6W
Capacitor		
C1	4822 126 10039	Chip,10nF
C2	4822 126 11637	22nF
PS1	4822 130 82705	Ph interrupter
CN1	4822 403 70456	Wire trap
CN2	4822 265 41137	7Pin connector
CN3	4822 265 30908	4Pin connector

Loading mda board

PWBA	4822 214 33377	Load.Mda board as
Integrated circuit		
IC1	4822 209 30245	XRA6418N
Capacitor		
C1	4822 124 23846	Elco,47μF
C3	4822 121 43348	22nF
SPC1	4822 462 41856	Spacer
CN1	4822 403 70462	Wire trap

Cassette housing board

PWB1	4822 214 33378	Cass.Housing board
Transistor		
Q2	4822 130 62798	Photo transistor
Capacitor		
C1	4822 126 11631	10nF
PHS3	4822 130 82707	Cass.Sensor
CN2	4822 267 41014	4Pin socket

Full erase head board

PWB1	4822 214 33365	F.E.Head board

Lubricants

5322 390 10096	Oil Cosmo-hv56
4822 389 10001	Grease Kanto-g-31kav

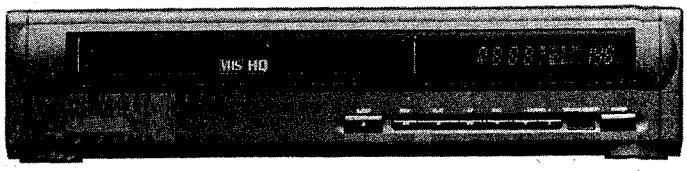
Tools

4822 397 30107	Alignm.Tape mh2
4822 395 80196	Torque gauge
4822 395 80198	Gauge head
4822 395 90615	Tape tens.Cass.
4822 395 90614	A/c head tool
4822 395 90904	Roller driver.

V01911

Video Cassette Recorder VR3241/75

Service
Service
Service



45 251 A

Service Manual

VHS
PAL

VR3241/75 is a video cassette recorder with a TV-reception part and electronic timer, suitable for recording and playing back TV signals, which meet the CCIR-PAL B.H. standard.
The signals are recorded on tape according to the VHS standard.

Contents:

Specifications	2
Disassembly and mechanism adjustments	1-1
Electrical adjustments	2-1
Charts and diagrams	3-1
Exploded views and parts list	4-1
Electrical parts list	5-1
Technical informations	6-1

I.R.-Remote Control VR3241/75 Servicecodenumber: 4822 218 30606

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

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GB 4822 726 14943

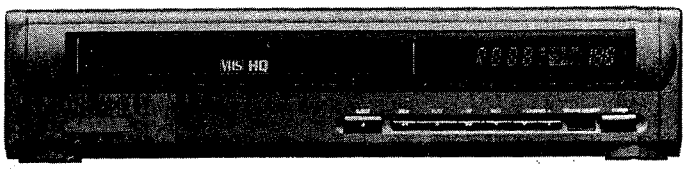
Format	:	VHS PAL standard
Video recording system	:	Two rotary head helical scan system
Video signal	:	PAL colour and B/W signals 625 lines
Recording playing time	:	4 hours max. with E240 tape (SP mode)
Tape width	:	12.7 mm
Tape speed	:	SP 23.39 mm/sec.
Antenna	:	75 ohm unbalanced
Receiving channel	:	VHF NZ 1-AUS 0 AUS 11-NZ 11 UHF 21-69
RF converter output signal	:	VHF CH 0-1
Power requirement	:	AC 240V 50Hz
Power consumption	:	Approx. 19W
Operating temperature	:	5°C to 40°C
Operating Humidity	:	5-80 %
Storage temperature	:	-20°C to 55°C
Weight	:	5.0 kg
Dimensions	:	360 mm (W) x 330 mm (D) x 85 mm (H)
VIDEO		
Input	:	1.0 Vp-p, 75 ohm
Output	:	1.0 Vp-p, 75 ohm
AUDIO	:	0dB = 0.775 Vrms
Input	:	Line: -8dBs, more than 47k ohm
Output	:	Line: -8dBs, less than 47k ohm
Accessories included	:	Antenna 75 ohm coaxial connector cable Operation Manual Infrared remote control Battery

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

Note:
The antenna must correspond to the new standard DIN 45325 (IEC 169–2) for combined UHF/VHF antenna with 75 ohm connector.

Video Cassette Recorder VR3241/75

Service
Service
Service



45 751 A

Service Manual

VHS
PAL

VR3241/75 is a video cassette recorder with a TV-reception part and electronic timer, suitable for recording and playing back TV signals, which meet the CCIR-PAL B.H. standard.
The signals are recorded on tape according to the VHS standard.

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GB 4822 726 14943

Format	:	VHS PAL standard
Video recording system	:	Two rotary head helical scan system
Video signal	:	PAL colour and B/W signals 625 lines
Recording playing time	:	4 hours max. with E240 tape (SP mode)
Tape width	:	12.7 mm
Tape speed	:	SP 23.39 mm/sec.
Antenna	:	75 ohm unbalanced
Receiving channel	:	VHF NZ 1-AUS 0 AUS 11-NZ 11 UHF 21-69
RF converter output signal	:	VHF CH 0-1
Power requirement	:	AC 240V 50Hz
Power consumption	:	Approx. 19W
Operating temperature	:	5°C to 40°C
Operating Humidity	:	5-80 %
Storage temperature	:	-20°C to 55°C
Weight	:	5.0 kg
Dimensions	:	360 mm (W) x 330 mm (D) x 85 mm (H)
VIDEO		
Input	:	1.0 Vp-p, 75 ohm
Output	:	1.0 Vp-p, 75 ohm
AUDIO	:	0dB = 0.775 Vrms
Input	:	Line: -8dBs, more than 47k ohm
Output	:	Line: -8dBs, less than 47k ohm
Accessories included	:	Antenna 75 ohm coaxial connector cable Operation Manual Infrared remote control Battery

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

Note:
The antenna must correspond to the new standard DIN 45325 (IEC 169–2) for combined UHF/VHF antenna with 75 ohm connector.

SECTION 1
DISASSEMBLY AND MECHANISM ADJUSTMENTS

1.1 DISASSEMBLY

1.1.1 Top cover

1. Refer to Fig. 1-1-1 and set for the EJECT (Stop) mode and disconnect VCR from AC power.
2. Take out 5 screws Ⓐ . To remove the top cover, slide in direction of arrow and lift away.

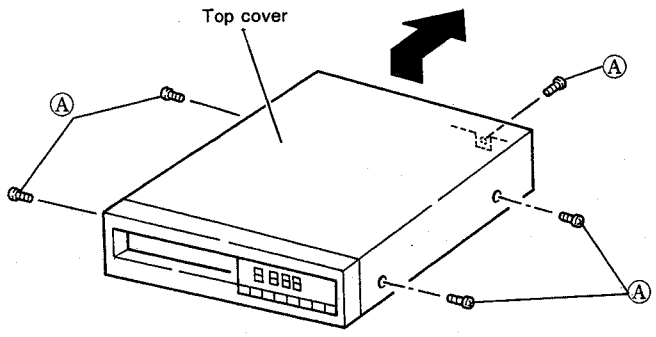


Fig. 1-1-1

1.1.2 Front panel assembly

1. Remove the top cover.
2. Carefully disengage 3 tabs Ⓑ of the front panel assembly from the upper side of the chassis.
3. Refer to Fig. 1-1-2 and pull the front panel assembly forward you to disengage 3 tabs Ⓒ of the front panel assembly from the bottom side of the chassis, then remove the front panel assembly.

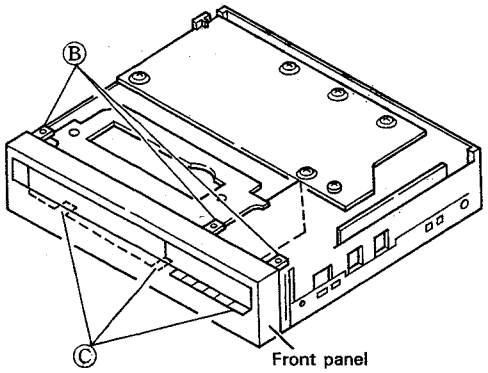


Fig. 1-1-2

1.1.3 Bottom cover

1. Remove the top cover.
2. Refer to Fig. 1-1-3 and take out 3 screws Ⓓ and disengage 8 claws Ⓔ from the bottom of the chassis.

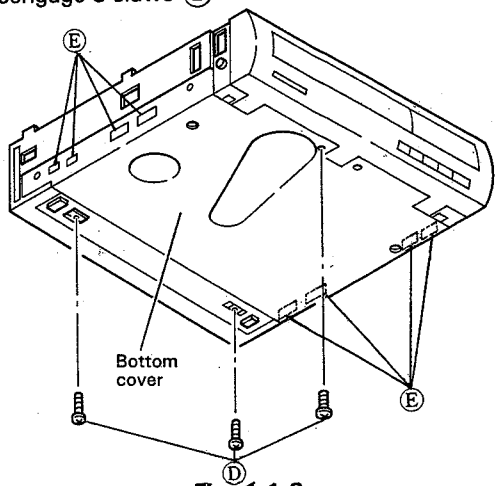


Fig. 1-1-3

1.1.4 Main board assembly

1. Remove the top cover.
2. Refer to Fig. 1-1-4. Take out 4 screws Ⓖ and disengage 1 claw Ⓗ from main board assembly.
3. Remove the main board assembly in the upward direction.

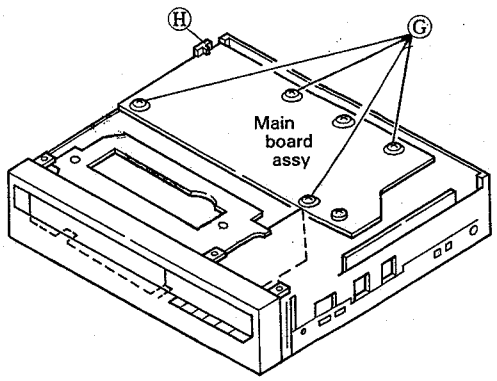


Fig. 1-1-4

1.1.5 Cassette housing

1. Remove the top cover, front panel and main board assembly.
2. Refer to Fig. 1-1-5.
   Take out 4 screws Ⓙ that secure the cassette housing.
3. Remove the cassette housing in the upward direction.

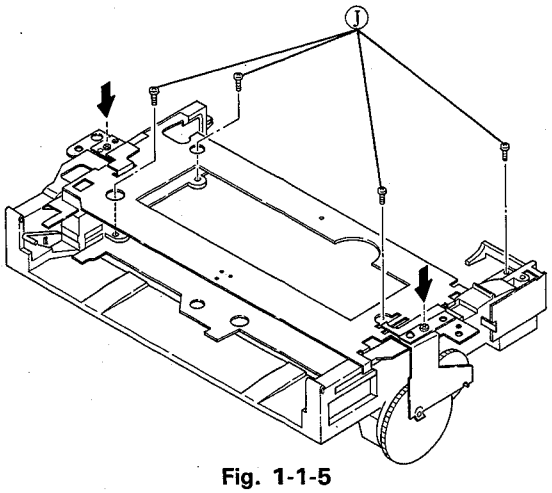


Fig. 1-1-5

1.1.6 Cassette housing installation

1. On the main deck, observe the positional relationships of the parts indicated in Fig. 1-1-6.
   If necessary, turn the loading motor by hand to obtain these positions.

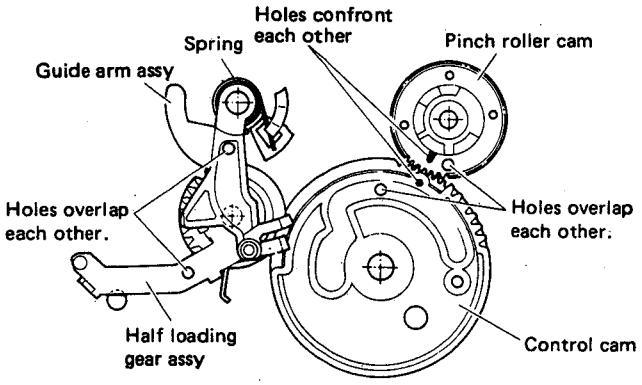


Fig. 1-1-6

2. Refer to Fig. 1-1-7 and confirm that the clutch is engaged.
   If necessary, press the lever indicated by the arrow to where the clutch is locked.

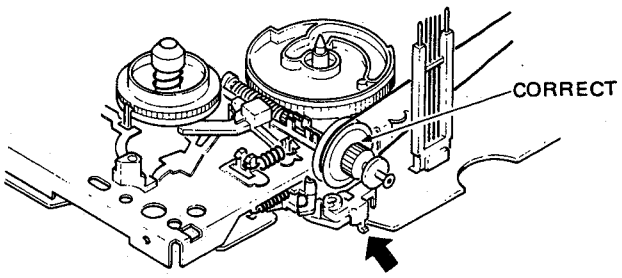


Fig. 1-1-7

3. Check that the cassette housing is in the eject state (internal holder of the cassette housing is locked in raised position).
   Set the cassette housing into place and secure with 4 screws.
4. Install the front panel as shown in Fig. 1-1-8 and re-engage the tabs. Supply power and use a spare cassette to check for normal loading and eject operations.

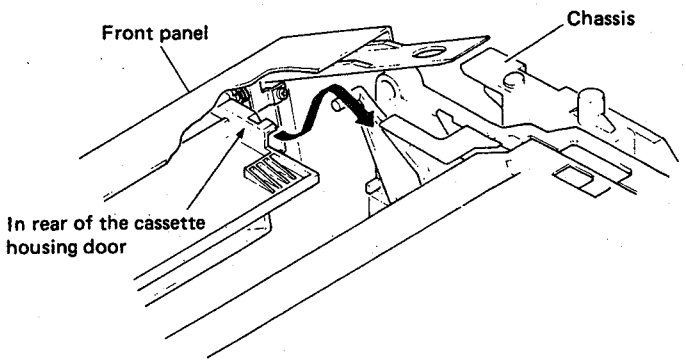


Fig. 1-1-8

5. Disconnect VCR from power, then reinstall the main board assembly and top cover.

1.1.7 Cassette housing door

1. Remove the top cover and front panel assembly.
2. Refer to Fig. 1-1-9, with a lift of cassette housing door by hand, bend center of the cassette housing door toward you, then pull out the left end from the cassette housing.
3. Refer to Fig. 1-1-9 and use care regarding the torsion spring, then pull out the right end of the cassette housing door to move it.

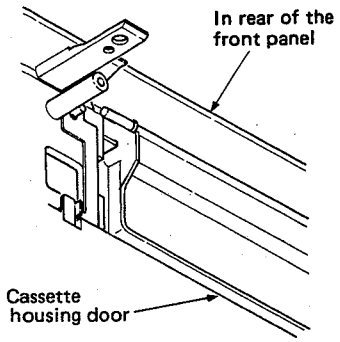


Fig. 1-1-9

1.1.8 SWITCHING REGULATOR board assembly

1. Remove the top cover and main board assembly.
2. Refer to Fig. 1-1-10, take out 2 screws Ⓚ.
3. Remove the SWITCHING REGULATOR board assembly in the upward direction.

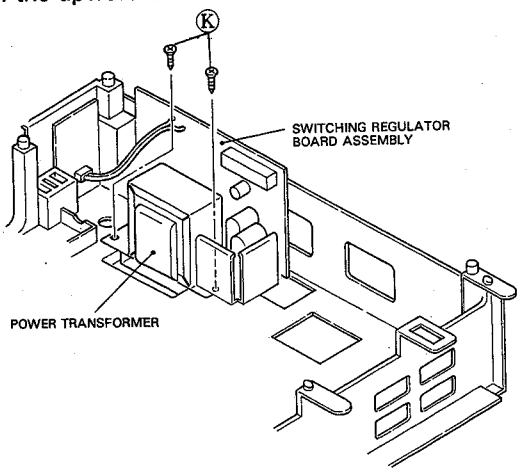


Fig. 1-1-10

1.1.9 Pre/Rec board assembly

1. Remove the top cover and main board assembly.
2. Refer to Fig. 1-1-11 take out 2 screws Ⓛ and remove the drum shield.

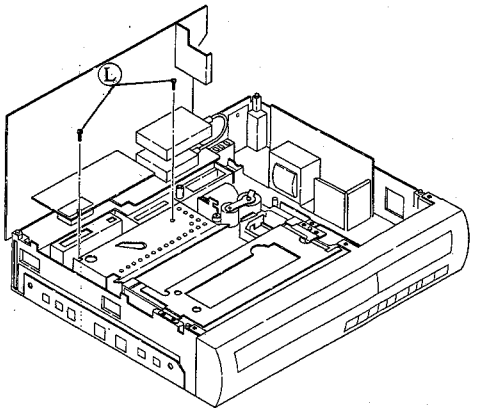


Fig. 1-1-11

3. Refer to Fig. 1-1-12, take out 2 screws Ⓜ and disengage flat wire.
4. Raise the Pre/Rec board assembly with shield case.

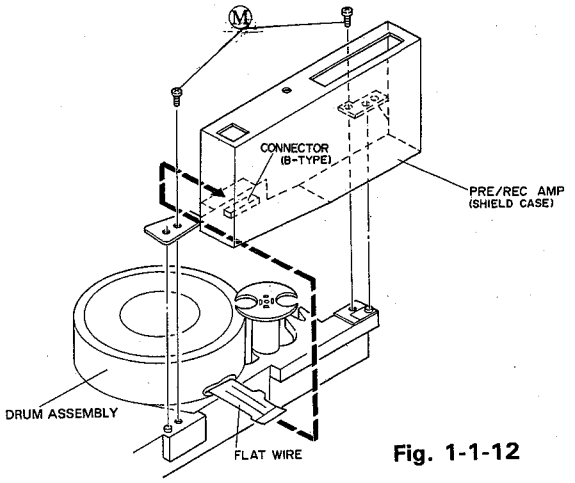


Fig. 1-1-12

1.1.10 Deck terminal board assembly

1. Remove the top cover and bottom cover.
2. Refer to Fig. 1-1-13 take out 4 screws Ⓝ.
3. Unsolder 3 positions and disengage 3 locks.
4. Remove the deck terminal board assembly.

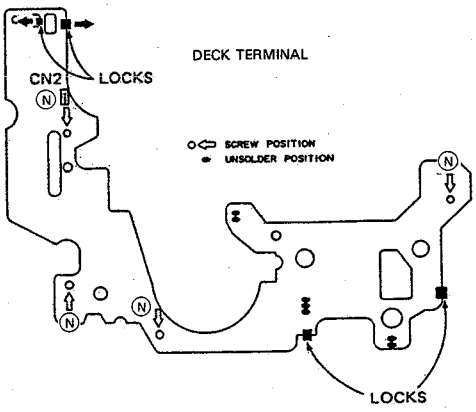


Fig. 1-1-13

1.1.11 Main deck assembly

1. Remove the top cover, front panel assembly and main board assembly.
2. Refer to Fig. 1-1-14, take out 3 screws Ⓞ and disengage 2 locks from the main deck assembly.
3. Remove the main deck assembly in the upward direction.

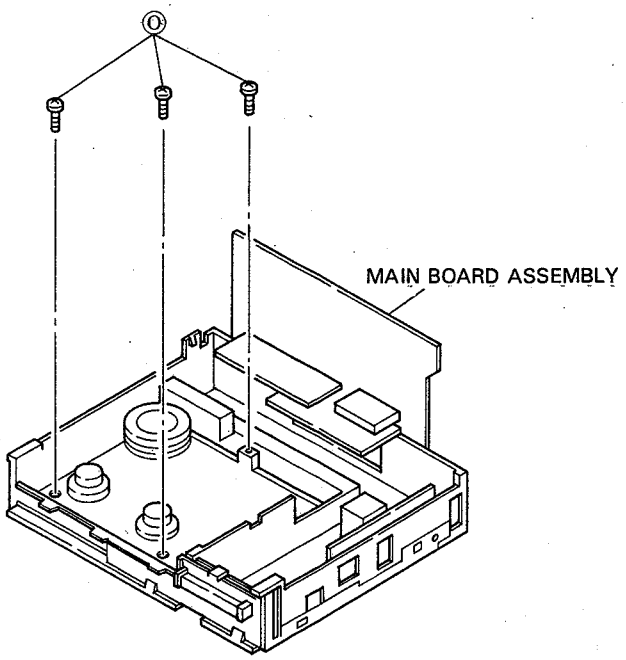


Fig. 1-1-14

1.1.12 Capstan motor assembly

1. Remove the top cover, bottom cover, main board assembly, drum shield and deck terminal board assembly.
2. Remove the capstan belt, capstan braked assembly and capstan brake compression spring, from the bottom of the deck.
3. Take out 3 screws Ⓟ from the top of the deck and remove the capstan motor assembly.

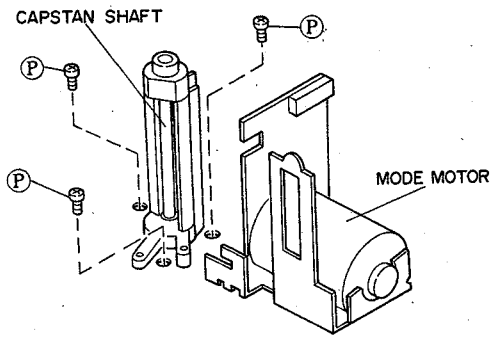


Fig. 1-1-15

1.1.13 Drum assembly

1. Take out 3 screws Ⓠ and disengage the connector from the drum assembly, as shown in Fig. 1-1-16.
2. Carefully lift the drum assembly together with the pre/rec board assembly.

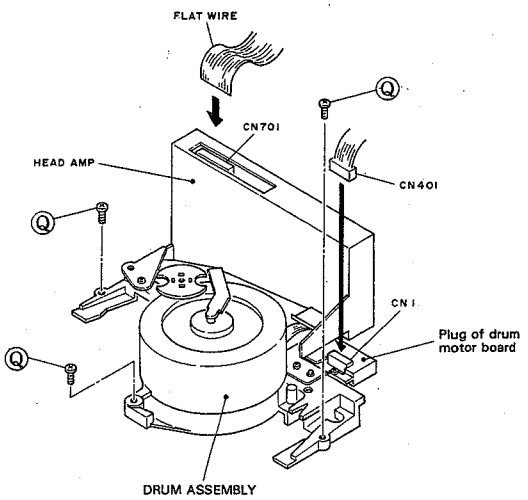


Fig. 1-1-16

1.2 MECHANISM ADJUSTMENTS

1.2.1 Precautions

1. Disconnect mainframe from AC power before soldering.
2. Avoid imparting stress to wires when disengaging connectors.
3. Determine and correct the cause of difficulty before proceeding to adjustments. Do not disturb settings unnecessarily.
4. Use care not to damage tabs, claws, etc. during repairs.
5. Install the cassette housing assembly only when the mechanism is in the Eject or Stop mode position. In the Eject mode, the internal holder of the housing is fully raised. This is fully lowered in the Stop mode.
6. When installing the front panel assembly, be sure to engage the housing door with the door lever of the cassette housing assembly. If this is omitted, the door will not open at Eject and the cassette cannot be removed.

1.2.2 Check without cassette housing

Mechanism operations can be observed easily by removing the cassette housing assembly. Note the following.

1. Disable the photo transistor sensor (END SENSOR) on the main-deck by applying an opaque cover.
2. Connect pins 2 and 3 of Main board connector CN601.
3. Select the desired modes with the operation buttons. However, notice that without tape, setting for the reverse direction modes produces the Stop mode after a few seconds due to absence of the reel sensor output.

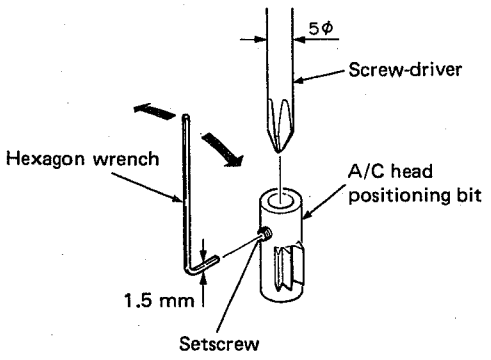


Fig. 1-2-1 A/C head positioning tool

1.2.3 Manually removing cassette tape

In event of electrical system failure that prevents the tape from being unloaded, the tape can be removed manually by the following procedure. Refer to Figs. 1-3-1, 1-3-2 and 1-3-3.

1. Disconnect power cord from AC outlet.
2. Turn the loading motor by hand so that the control cam rotates clockwise. This retracts the pole base assembly to the unloading position.
3. Continue turning to where the guide arm and half loading gear assemblies shift to beneath the cassette.
4. Turn the clutch assembly at the rear of the deck to absorb slack tape within the cassette.
5. Again turn the loading motor in the same direction to raise the cassette and remove it.

1.2.4 Test equipment

The following special tools and fixtures are required for mechanism adjustment.

1. Alignment tapes : MH-2
   Stairstep signal is employed for interchangeability checks and adjustments.
2. Torque gauge
   Measures tape take-up torque.
3. Back tension cassette gauge
   Measures tape tension at the supply side.
4. A/C head positioning bit
   - Shifts the head base for adjusting the control head position.
   - **The installation of a A/C head positioning bit on the screw-driver.**
     Refer to Fig. 1-2-1. Set screw-driver into the A/C head positioning bit where it does not interfere with adjusting the A/C head adjusting boss (position the screw-driver point 6 ± 2 mm from point of the A/C head positioning bit). Slightly tighten the setscrew by hexagon-wrench (1.5 mm).
5. Roller driver
   Turns the guide roller for adjusting FM linearity.

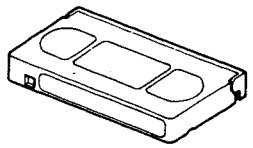
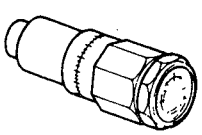
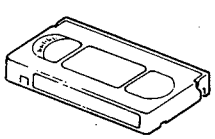
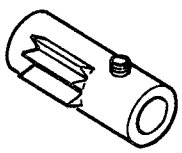
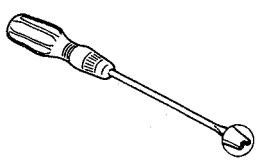
Alignment tapes 1	Torque gauge 2	Back tension cassette gauge 3	A/C head positioning bit 4	Roller driver 5
				

Fig. 1-2-2 Test equipment

1.3 MAIN MECHANISM PARTS

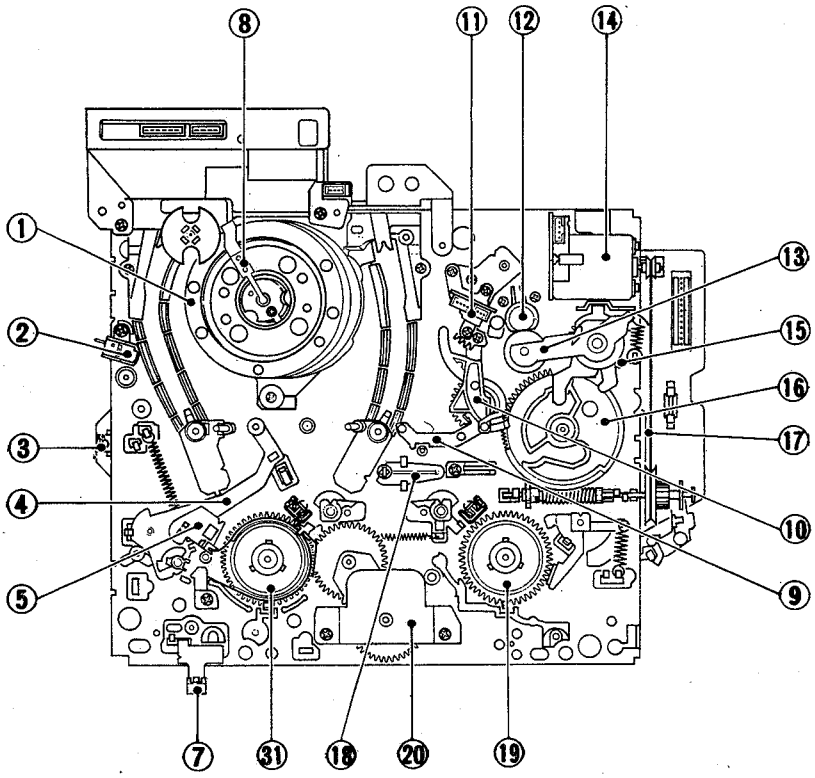


Fig. 1-3-1 Top view of main-deck

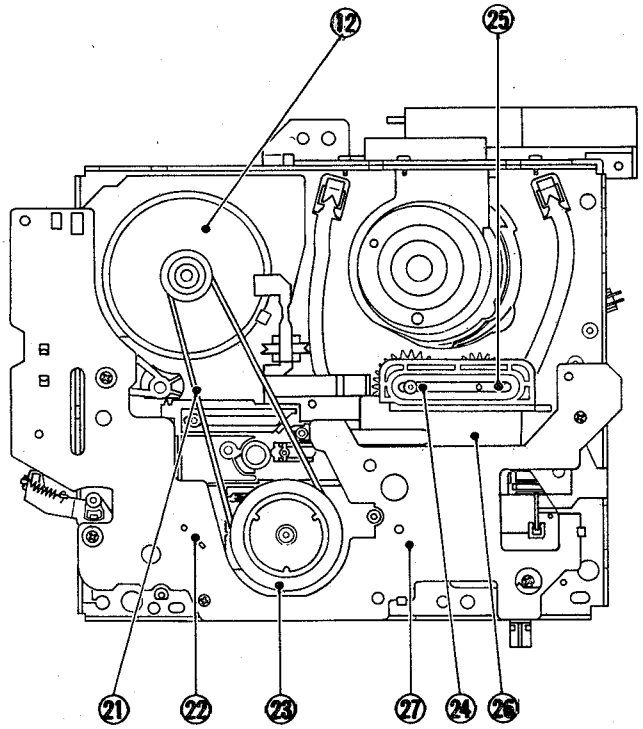


Fig. 1-3-2 Bottom view of main-deck

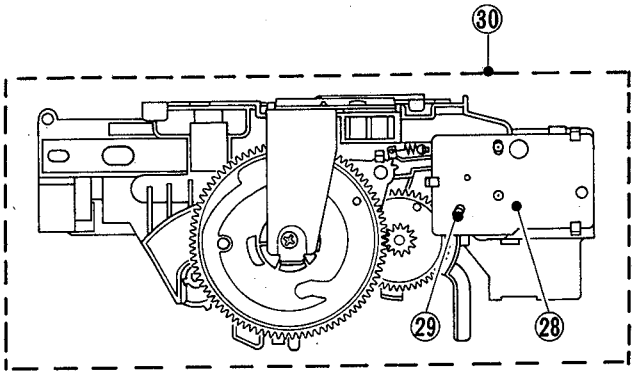


Fig. 1-3-3 Side view of cassette housing

A. Cleaning

Periodic cleaning of the tape transport system is desirable, but ordinarily not feasible in practice. Therefore, perform cleaning when a set is brought in for repairs or maintenance. Contamination of the video heads, tape guides and brushes can detract from playback picture quality and in extreme cases, even damage the tape. For cleaning, use a fine-mesh cotton cloth (about the texture of a white dress-shirt) moistened in alcohol.

- To clean the video heads, press the moistened cloth gently against the upper drum with fingertip and turn the drum by hand.
- Do not use a vertical stroke, as this may damage the heads.

B. Lubrication

Oil and grease do not normally require periodic replenishing Apply only when replacing lubricated parts (also clean and replace lubrication of mating parts if soiled).

For parts and points to apply oil and grease, refer to the exploded views of the mechanism assembly.

Before oiling, clean with alcohol.
Apply one or two drops of oil. Avoid excess oil.

1. Table 1-1 indicates the oil and grease used in this set. Use these or recommended locally available equivalents.

Category	Part No.
Oil	5322 390 10096
Grease	4822 389 10001

Table 1-1

2. Grease is not required for a replacement cassette housing assembly, as this has been applied at the factory.

Note: ***Stir grease that has been stored for an extended period.***

C. Main mechanical parts

See Fig.s 1-3-1, 1-3-2 and 1-3-3.

No.	Parts Name	See Section
1	Drum assy	1.5.1
2	Full erase head	
3	End sensor	
4	Tension arm assy	1.5.4
5	Tension band assy	1.5.4
7	REC safety switch	
8	Brush assy	
9	Half loading gear assy	1.5.5
10	Guide arm assy	1.5.5
11	Audio/control head	1.5.3
12	Capstan motor	
13	Pinch roller arm assy	
14	Loading (Mode) motor assy	
15	Pinch roller cam	1.5.5
16	Control cam	1.5.5
17	Loading belt	
18	LED holder (D1)	
19	Reel disk (take-up)	
20	Idler gear unit	
21	Timing belt	
22	Take up reel sensor (PS1)	
23	Clutch unit	1.5.6
24	Take up loading arm assy	1.5.7
25	Supply loading arm assy	1.5.7
26	Plate assy	1.5.7
27	Slide switch (S3)	
28	Cassette sensor (PHS3)	
29	Start sensor (Q2)	
30	Cassette housing assy	
31	Reel disk (supply)	

1.4 INSPECTION AND MAINTENANCE

This product employs rotary and moving parts which wear out in the course of usage. Periodic inspection, cleaning, lubrication and maintenance are therefore important for ensuring maximum performance. Worn parts must also be replaced at when required.

1.4.1 Suggested servicing schedule for main components

The following table indicates the suggested period for such service measures as cleaning, lubrication and replacement. In practice, the indicated periods will vary widely according to environmental and usage conditions. However, the indicated components should be inspected when a set is brought for service and the maintenance work performed if necessary.

Also note that rubber parts may deform in time, even if the set is not used.

System	No.	Parts Name	Periodic servicing schedule (operation hours)								
			250	500	750	1000	1250	1500	1750	2000	Over-haul
Tape Transport	1	Drum assembly	★	★	☆	○	○	○	○	○	●
	11	A/C head	★	★	★	○	○	○	○	○	●
	13	Pinch roller	★	★	★	○	○	○	○	○	●
	2	Full erase head	★	★	★	○	○	○	○	○	●
	4	Tension arm assy									●
	12	Capstan (shaft)	★	★	★	★	★	★	★	★	●
	9	Half loading gear assy									●
	10	Guide arm assy									●
Drive	12	Capstan motor				○	○	○	○	○	●
	17	Loading belt				○	○	○	○	○	●
	21	Timing belt				○	○	○	○	○	●
	19	Reel disk (take-up)				○	○	○	○	○	●
	31	Reel disk (supply)				○	○	○	○	○	●
	23	Clutch unit								○	●
	14	Loading motor assy				○	○	○	○	○	●
		Worm clutch assy								△	●
	26	Plate assy								△	●
Others	5	Tension band assy				○				○	●
	8	Brush assy				○				○	●

★ : Cleaning
☆ : Cleaning (or Replacement if necessary)
△ : Lubrication
No: Refer to Main mechanical parts

▲ : Lubrication (or Replacement if necessary)
● : Replacement
○ : Inspection or Replacement if necessary

Table 1-4-1 *Approximate maintenance schedule*

1.5 MAIN PARTS REMOVAL AND REPLACEMENT

No.	Item	Checkpoints	Adjustment and Checks
1	Upper drum assembly •Symptoms: FM signal absent, intermittent or weak on one channel; large difference in channel output levels •Cause: Worn or damaged video heads, poor response, etc.	Mounting direction See Fig. 1-5-1. (Symptom: no picture)	After replacing, observe that upper drum hole A is opposite the motor axis from lower drum hole B.
		Axis wobble See Fig. 1-5-2. (Symptom: jitter, poor FM linearity) PB FM: Main board CN201-3 Drum FF: Main board TP411	Record and playback. Confirm absence of large difference between channels. (Fig. 1-5-3)
		FM linearity check See Fig. 1-5-5. (Symptom: vertical sync absent, picture noise) PB FM: Main board CN201-3 FF: Main board TP411 Digital tracking off: refer to 1.6	1) Play stairstep signal of the MH-2 Alignment Tape. Confirm absence of obvious FM waveform loss and that operating the Tracking yields the optimum point. 2) Refer to Fig. 1-5-4, adjust for loss at the left edge (drum entry) of the FM waveform by turning the guide roller of the supply pole base. Similarly, adjust for loss at the right edge (drum exit) by turning the guide roller of the take-up pole base. **Note:** ***If FM loss occurs on both channels and cannot be corrected by adjusting the guide rollers, the lower drum needs replacement.***

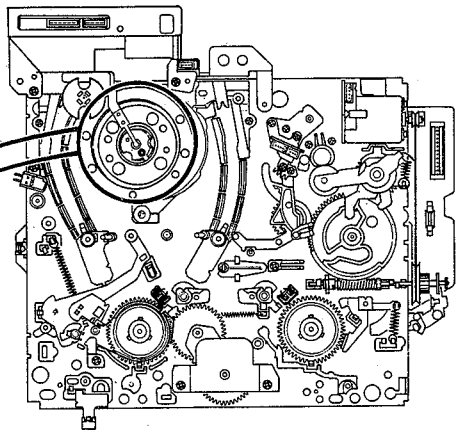


Fig. 1-5-2 Drum Position

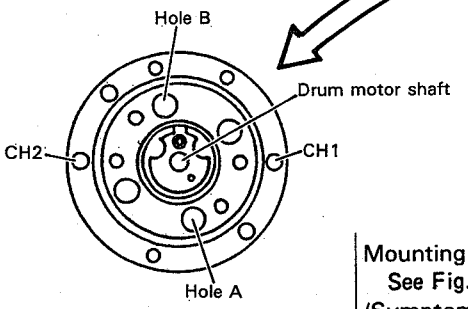


Fig. 1-5-1 Drum top view

Fig. 1-5-3 Axis wobble

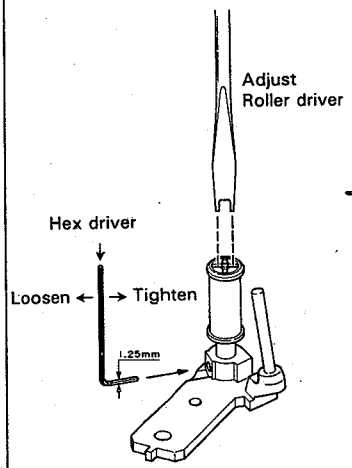


Fig. 1-5-4 S.T. Pole base

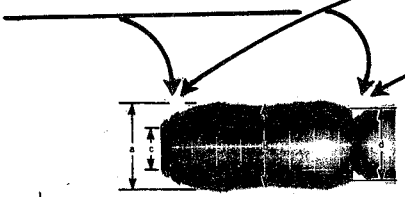


Fig. 1-5-5 FM linearity

$\frac{b}{a} \geqq 0.7, \frac{c}{a} \geqq 0.65, \frac{d}{a} \geqq 0.65$

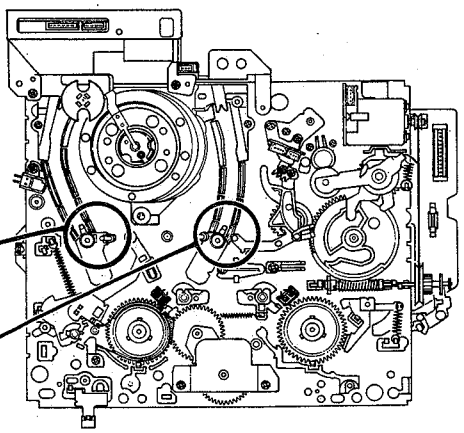
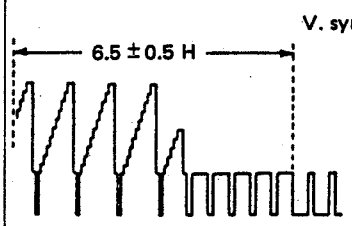
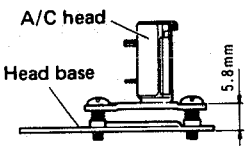
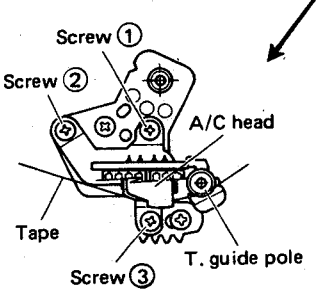
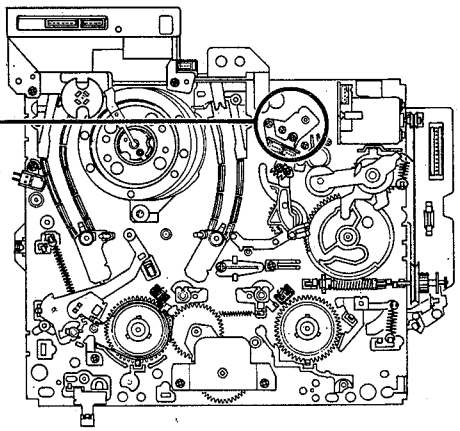
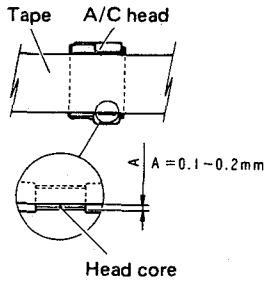
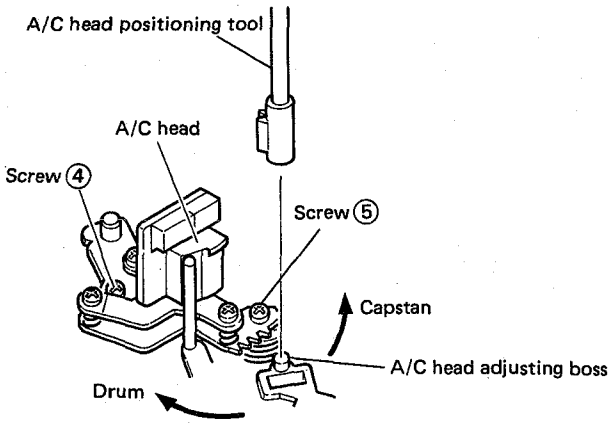
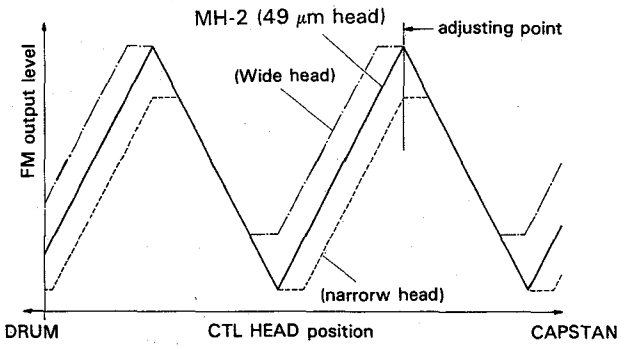


Fig. 1-5-6 S.T. Pole base position

No.	Item	Checkpoints	Adjustment and Checks
	PB switching point •Symptom: switching noise at picture bottom.	VIDEO OUT (TP210)  **Fig. 1-5-7** PB Switching Point	1) Connect VCR to AC. Turn power on. 2) Connect an oscilloscope to VIDEO OUT. 3) Set the MH-2 alignment tape into the cassette housing. Play back the stairstep segment of MH-2 alignment tape. 4) Trigger the oscilloscope externally (– slope) with the signal from TP411 (Drum FF) of the video board. 5) Adjust R402 to position the trigger point 6.5 H ±0.5 H from V. sync as shown in Fig. 1-5-7.
2	Lower drum assembly •Symptoms: Poor FM linearity, noisy rotation, jitter •Cause: Lead and bearing wear	Check FM linearity and switching point.	See above upper drum assembly items.
		Check control head phase (X value) Symptom: tracking error PB FM: Main board TP206 Drum FF: Main board TP411	1) Play stairstep signals of MH-2 Alignment Tapes. Engage the Digital tracking on mode by pressing the "∨ CH" and "∧ CH" buttons simultaneously in the playback mode. Confirm that the same maximum FM waveform level is obtained as when the tracking is adjusted manually. 2) Refer to the A/C head adjustments.
3	A/C head  **Fig. 1-5-8** Temporary height  **Fig. 1-5-9** Inclination/Azimuth/ Height adj.	 **Fig. 1-5-10** A/C HEAD position	
		Temporarily set height as indicated in Fig. 1-5-8.	Set the height as indicated in Fig. 1-5-8 to facilitate tape transport checks and adjustments.
		Tilt (forward inclination) See Fig. 1-5-9. (Symptom: audio level varies greatly.)	1) Run tape, turn screw ① counterclockwise to where slight curling of the tape occurs at the lower flange of the take-up guide roller. 2) Then slowly turn the screw clockwise to where the curling ceases.
		Azimuth See Fig. 1-5-9. (Symptoms: audio low level or noisy) Audio output: Main board AUDIO OUT	1) Play stairstep signal (with audio 6 kHz) of the MH-2 Alignment Tape. Observe audio output signal with oscilloscope. 2) Turn screw ② and adjust for maximum audio output level.

No.	Item	Checkpoints	Adjustment and Checks
	 Fig. 1-5-11 Height Adj	Height See Fig.s 1-5-9 and 1-5-11. (Symptom: low audio and control signal levels)	1) Run tape and observe the control head area. 2) Turn screws ①, ② and ③ by small and equal amounts until 0.1 to 0.2 mm of the head core bottom can be seen. **Note:** ***If difficult to observe, play stairstep signal of MH-2 Alignment Tape and adjust for maximum audio output and control pulse level.***
		FM linearity	Refer to upper drum assembly items. If adjustment is major, again check the azimuth.
	 Fig. 1-5-12 CTL head phase	Control head phase See Fig. 1-5-12 PB FM: Main board TP206 FF: Main board TP411	1) Play stairstep signal of MH-2 Alignment Tape and observe the FM waveform. Set for Digital tracking off by pressing the "V CH" and "Λ CH" buttons simultaneously in the playback mode. 2) Loosen screws ④ and ⑤. Set the A/C head positioning tool on the A/C head adjusting boss as shown in Fig. 1-5-12. 3) Turn the tool first to position the A/C head fully toward the capstan. Then gradually return it toward the drum and stop at the position of maximum FM waveform output level as shown in Fig. 1-5-13. 4) Tighten screw ⑤ . Remove the tool and tighten screw ④.
	 Fig. 1-5-13 CTL head phase		

Note: ***Trigger the oscilloscope externally signal from TP411 (DRUM FF). Use (+) trigger for MH-2 alignment tape.***

No.	Item	Checkpoints	Adjustment and Checks
4	Tension arm assembly Tension band assembly	Tension pole position See Fig. 1-5-14. (Symptom: poor FM waveform response)	1) Remove video cassette tape and set for the playback mode as following steps. 2) Disconnect VCR from AC. Slightly rotates the loading motor counterclockwise by hand, then press the lock level portion Ⓐ of the cassette housing by hand as shown in Fig. 1-5-16. 3) Move the raised portion of the cassette housing slide plate to fully forward by hand with loading motor. At this time, again press the lock level portion Ⓑ of the cassette housing slide plate to lower the cassette housing (internal holder of the cassette housing is locked in lowered position). 4) Cover the cassette LED with opaque material (insulated tape with black). 5) Connect VCR to AC. Press the power button on the Front panel and set for the playback mode. 6) Turn the eccentric adjust pin to align the edge of the chassis with the tension arm tip as shown in Fig. 1-5-14.
		Back tension (Symptom: skew)	1) When the tension pole position is correctly adjusted, the back tension will assume the correct value. 2) Use the Back Tension Cassette Gauge and set for the playback mode. Confirm reading of 30 to 43. 3) Changing the tension pole position in order to vary the back tension will cause adverse effects elsewhere.

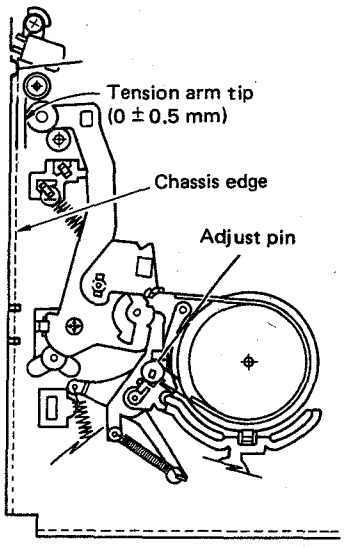


Fig. 1-5-14
Tension arm assy

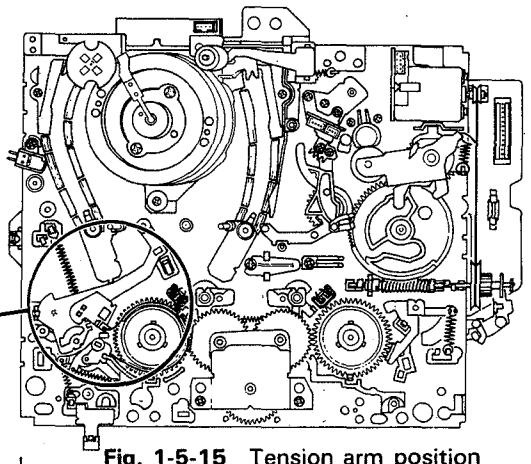


Fig. 1-5-15 Tension arm position

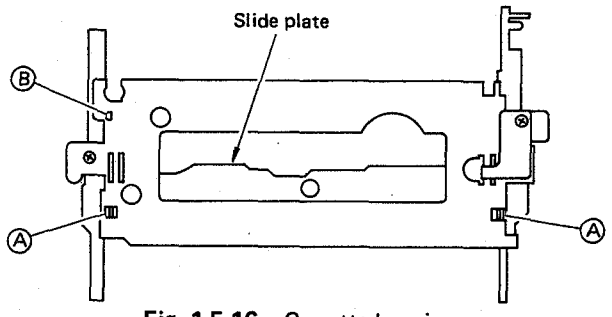
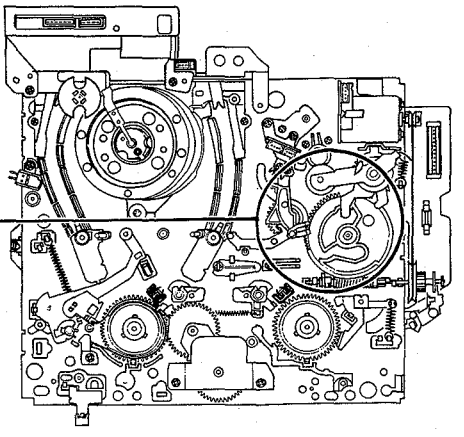


Fig. 1-5-16 Cassette housing

No.	Item	Checkpoints	Adjustment and Checks
5	Pinch roller cam Control cam Half loading gear assembly Guide arm assembly		Set mechanism to Eject mode (internal holder of the cassette housing is locked in raised) position.
			 **Fig. 1-5-18** Control cam position
		Important: Do not remove or disturb parts other than those mentioned. See Fig. 1-5-17.	1) When installing the pinch roller cam, overlap the largest hole of the gear portion with the hole of the deck. 2) Set the control cam on the deck with the hole of the groove overlapped with the hole of the deck. Observe that the small hole of the control cam and the ridge of the pinch roller cam are aligned. (If the control cam does not fit readily, shift the rear plate assembly within the range of play.) 3) Install the half loading gear assembly with the hole overlapped with the hole of the deck. Secure with E-ring. 4) Install the guide assembly over the spring and with the hole overlapping that of the deck. Engage the spring correctly.
		Cassette housing assembly	Install the cassette housing assembly with the mechanism in the Eject mode. Also observe that the inner holder of the housing is raised and locked.
6	Clutch assembly	Take-up torque (Symptom: inadequate take-up torque)	1) Remove cassette housing and set for play-back mode (see Section 1.2.2). 2) Set torque gauge on the take-up reel disk. Gradually relax your grip on the gauge and read the needle indication at the point the gauge begins to rotate with the disk. Confirm indication of 60 to 100.

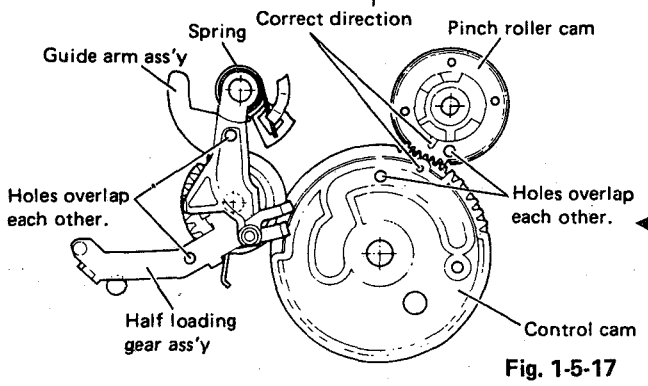


Fig. 1-5-17
Control/Pinch roller cam

No.	Item	Checkpoints	Adjustment and Checks
7	Take-up loading arm assembly Supply loading arm assembly Plate assembly		**Notes:** • *Set mechanism to the Eject or Stop mode before removing these parts.* • *The flange of the plastic rivet securing the loading arm assembly and the pole base assembly can be damaged by attempting to remove it directly. Press the loading arm assembly firmly to prevent motion. Then use a narrow-shafted tool to press the rivet from the shaft end to remove it.*
		Mounting position alignment • Remove the tension arm assembly to facilitate operation. See Fig. 1-5-19 .	1) Set the supply and take-up loading arm assemblies so that the holes of the gear portions are aligned, then secure to the pole base assemblies with rivets. 2) Shift the plate assembly and install with the holes of the upper and lower components overlapped.
		Slide switch See Fig. 1-5-19 .	Be sure to engage the slide switch slider with the edge of the plate assembly.

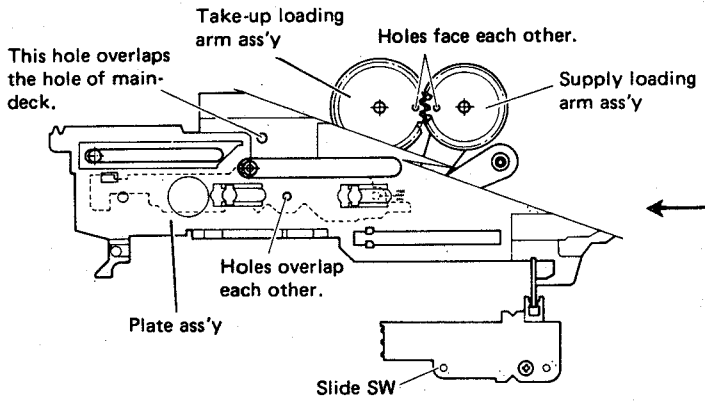


Fig. 1-5-19

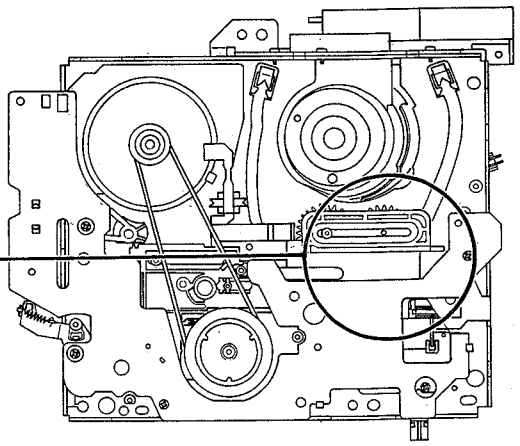


Fig. 1-5-20
T.S. Loading arm position

SECTION 2
ELECTRICAL ADJUSTMENTS

2.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts.
It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

2.1.1 Required test equipment

1. Color television or monitor
2. Oscilloscope:
   wide-band, dual-trace, triggered delayed sweep
3. Frequency counter
4. Audio oscillator
5. Audio voltmeter
6. Digital voltmeter
7. Signal generator: RF/IF sweep/marker
8. Signal generator: PAL color bar, stairstep, video sweeper
9. Signal generator: Audio multiplex TV signal generator
10. Recording tape
11. Alignment tape: MH-2
12. Presetting unit

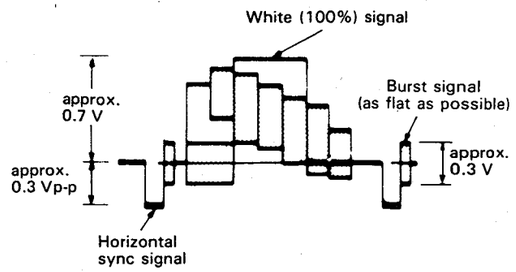


Fig. 2-1-1 Colour bar signal of pattern generator

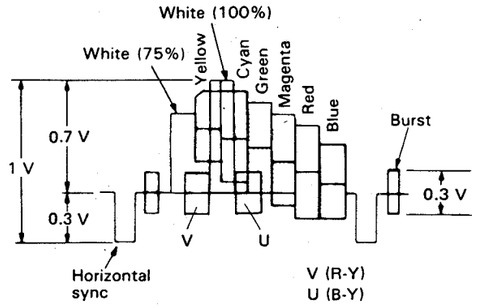


Fig. 2-1-2 Colour bar signal waveform

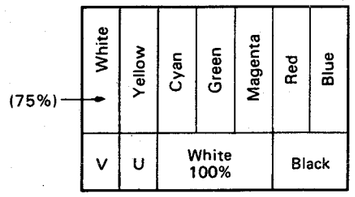


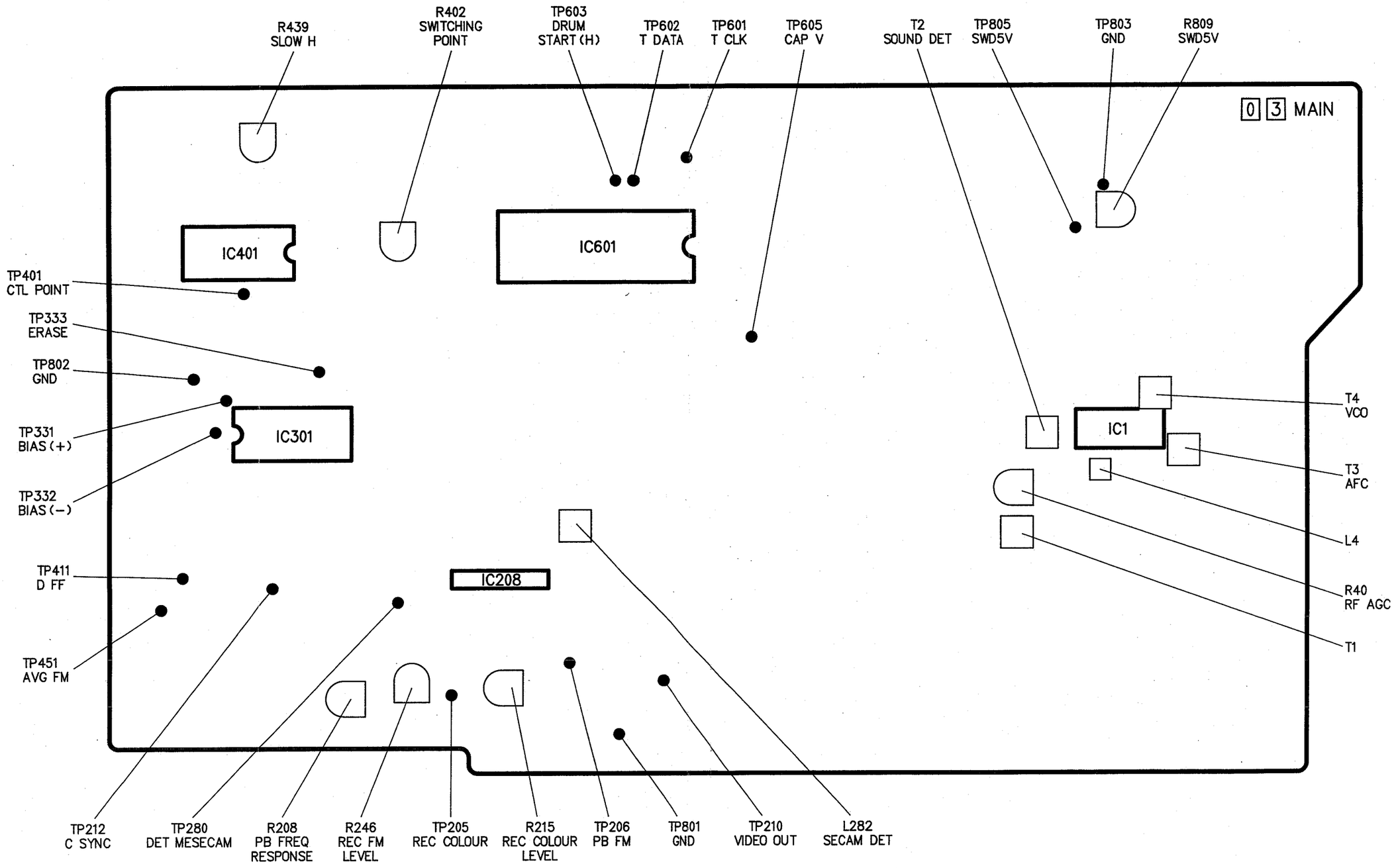
Fig. 2-1-3 Colour bar pattern

2.1.2 Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

No.	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
Item	Name assigned to the particular check and adjustment step.
Check Point	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
Adjustment Parts	Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (—) indicates check only.
Signal & Mode	• Input signal required to perform adjustment. Dash (—) indicates that special signal is not required. • Equipment operating mode at time of check or adjustment.
Color bars	Color bars signal as video input.
Stairstep	Stairstep signal as video input.
1 kHz	1 kHz sinewave as audio input signal.
MH-2 color bars	Color bars segment of MH-2 alignment tape.
MH-2 stairstep	Stairstep segment of MH-2 alignment tape.
MH-2 1 kHz	1 kHz audio signal segment of MH-2 alignment tape.
MH-2 RF sweep	RF sweep segment of MH-2 alignment tape.
E-E	Power on and machine in Stop mode.
REC	Recording mode
PB	Playback mode
SEARCH	Search (FWDS and REVS) playback mode
SLOW	Slow motion playback mode
STILL	Pause during playback mode
SP mode	SP recording speed
Description	This column provides an explanation of the step, notes and adjustment values.

2.1.3 LOCATION OF TEST POINTS AND VRS ON THE MAIN BOARD ASSY



2.2 SWITCHING REGULATOR CIRCUIT

Note: ***Unless otherwise specified, all test points and adjustments are located on the MAIN board.***

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
1	5V DC output voltage	• REC	• TUNER	• TP805 • TP803 (GND)	• R809	1) Connect a digital voltmeter between TP805 and TP803. 2) Record in the TUNER mode, adjust R809 for 5.30±0.05 V.

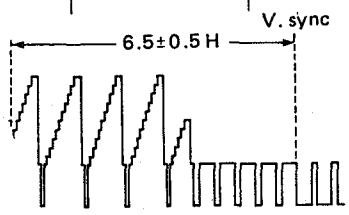
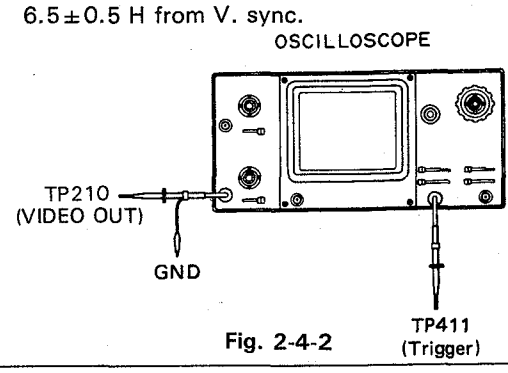
2.3 TIMER CIRCUIT

Note: ***Unless otherwise specified, all test points and adjustments are located on the T/D/S board.***

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
1	Clock	• EE	• AUX	• IC1-16	• C6	**Note:** ***For below adjustments use 10:1 probe with input capacitance lessthan 100 pF.*** 1) Disconnect VCR from AC. Connect a frequency counter between IC1-16 and GND. 2) Short IC1-8 to GND, then short the leads of capacitor C3 once in order to reset IC1. 3) Connect VCR to AC. All FDP Segments are on. 4) Adjust C6 for 2048.000±0.002 Hz (488.2808 to 488.2818 μsec).

2.4 SERVO CIRCUIT

Note: ***Unless otherwise specified, all test points and adjustments are located on the MAIN board.***

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
1	PB switching point	• PB	• MH-2 stairstep • Trigger slope (−)	• TP210 (VIDEO OUT)	• R402 (SW point)	1) Connect an oscilloscope to TP210. 2) Play back the stairstep segment of MH-2 alignment tape. 3) Trigger the oscilloscope externally (− slope) with the signal from TP411. 4) Adjust R402 to position the trigger point 6.5±0.5 H from V. sync.  Fig. 2-4-1  Fig. 2-4-2
2	Slow tracking preset	• REC then PB (slow)		• TV monitor	• Presetting unit	**Note:** ***Set VCR to A mode by remote controller.*** 1) Set recording video tape into the cassette housing. 2) Receive a colour broadcast on a VHF-HI channel or supply a colour bar signal to VIDEO IN. 3) Record a colour broadcast or colour bar signal. 4) Play back recorded signal in the FWD slow mode and set the tracking control of the FRONT panel to the center position by simultaneously pressing the (V) and (Λ) TV PROG buttons. 5) Observe the display one a monitor-TV and adjust for optimum noise condition (best tracking) by depressing "B (−)" or "C (+)" buttons of presetting unit as required. 6) Depress the STOP button on the FRONT panel. 7) Confirm that the bar noise is not visible on the monitor in the slow mode.
3	Slow horizontal flicker	• REC then PB (slow)		• TV monitor	• R439 (SLOW H)	1) Do in the same manner as No. 2, 1)~6). 2) Adjust R439 that the horizontal flicker is minimum.

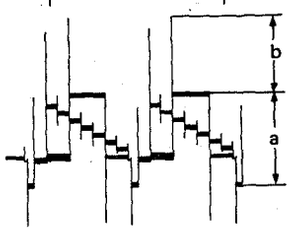
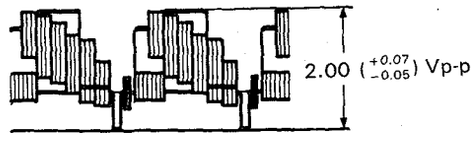
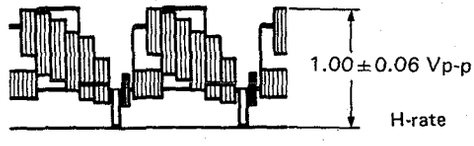
2.5 VIDEO CIRCUIT

Note: ***Unless otherwise specified, all test points and adjustments are located on the VIDEO unit board.***

IMPORTANT: Item 1,2,3 and 4

1. Ordinarily avoid performing these adjustments. It should be performed only if IC1 of the VIDEO UNIT board has been replaced.
2. To adjust, replace fixed resistor with variable resistor, then adjust as required.
3. V. RESISTOR

Ref. No.		Parts No.	Description
R17	NVP1301-332NU	4822 101 30679	3.3 kΩ PB Y LEVEL
R41	NVP1301-223NU	4822 100 11777	22 kΩ, CARRIER
R42	NVP1301-103NU	4822 115 50208	10 kΩ, DEVIATION
R56	NVP1301-152NZ	4822 100 11778	1.5 kΩ, N.C. BALANCE
R60	NVP1301-103NU	4822 100 11779	10 kΩ, EE Y LEVEL
R64	NVP1301-332NU	4822 101 30679	3.3 kΩ, WHITE CLIP

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
1	EE level & White clip	• EE	•Colour bar	•CN207-15 (Main board) •IC1-22	•R60 (EE level) •R64 (white clip) (VIDEO UNIT)	1) When IC1 of the VIDEO UNIT board is replaced, it may also be necessary to replace R60 and R64 with adjustable resistors. 2) Confirm 2.00 ($^{+0.07}_{-0.05}$) Vp-p EE level at CN207-15 and white clip of 90±4% at IC1-22. If necessary, replace R60 with NVP1301-103NU and R64 with NVP1301-332NU. 3) Supply a colour bar signal to VIDEO IN, connect one channel of a dual trace oscilloscope to CN207-15 and the other channel to IC1-22. 4) Alternately adjust R60 and R64 for 2.00 ($^{+0.07}_{-0.05}$) Vp-p at CN207-15 and white clip of 90±4% at IC1-22.
			 a : b = 100 : 90 **Fig. 2-5-1** White clip			 **Fig. 2-5-2** VIDEO OUT
2	Carrier & Deviation	• EE	•AUX	•CN206-9 (Main board)	•R41 (carrier) (VIDEO UNIT)	1) When IC1 of the video unit board is replaced, it may also be necessary to replaced R41 and R42 with adjustable resistors. 2) Play back a colour bar segment of MH-2 and confirm 1.00 (±0.06) Vp-p Y level at VIDEO OUT (75Ω load). If necessary, replace R41 with NVP1301-223NU and R42 with NVP1301-103NU. 3) Without an incoming signal. Terminate VIDEO OUT with TV-monitor (75Ω load), connect a frequency counter to CN206-9 on the MAIN board. 4) Adjust R41 for 3.8±0.04 MHz. 5) Play back a colour bar segment of MH-2, and confirm 1.00 (±0.06) Vp-p at VIDEO OUT. If necessary, redplace R17 with NVP1301-222NU.
	IMPORTANT: **Ordinarily avoid performing this adjustment. It should be performed only if IC1 of the VIDEO UNIT board has been replaced or if significant waveform distortion and S/N deterioration occur during recording and playback due to deficient adjustment of the carrier set and deviation.**					
		• REC then PB	•Colour bar •SP •AUX	•TP210 Video out (Main board)	•R42 (deviation) (VIDEO UNIT)	6) Record and play back a colour bar signal. If necessary, before recording, adjust R42 so that the Y level becomes 1.00 (±0.06) Vp-p at VIDEO OUT during playback mode.
			 **Fig. 2-5-3** Carrier and deviation			

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
3	YNR NC balance	• EE	•Colour bar •AUX	•IC1-9 (VIDEO UNIT)	•R56 (NC BAL) (VIDEO UIIT)	1) When IC1 of the video unit board is replaced, it may also be necessary to replace R56 with adjustable resistor. 2) Supply a colour bar signal to VIDEO IN, connect an oscilloscope to IC1-9 on the VIDEO UNIT board. 3) Confirm minimum DC step difference. If necessary, replace R56 with NVP1301-152NZ. 4) Adjust R56 for minimum DC step difference.
4	PB Y level	• REC then PB	•Colour bar •AUX •TP411 (DRUM FF) (Main board)	•CN207-15 (Main board)	•R17 (PB Y level)	1) When IC1 of the video unit board is replaced, it may also be necessary to replace R17 with adjustable resistor. 2) Record and play back a colour bar signal, confirm 2.00 $(^{+0.07}_{-0.05})$ Vp-p Y level at CN207-15. If necessary, replace R17 with NVP1301-222NU. 3) Connect oscilloscope to CN207-15. 4) Record and play back a colour bar signal, adjust R17 for 2.00 $(^{+0.07}_{-0.05})$ Vp-p at CN207-15.
5	REC FM level	• REC	•Colour bar	•TP703 (Pre/Rec board)	•R246 (REC FM ADJ) (Main board)	1) Supply a colour bar signal to VIDEO IN, connect an oscilloscope to TP703 of the PRE/REC board. 2) Record the colour bar signal. 3) Adjust R246 for 0.42 Vp-p pedestal level between centers of the waveform outline at the pedestal portion.

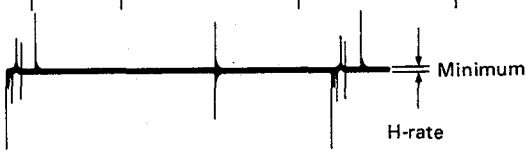


Fig. 2-5-4 YNR NC balance

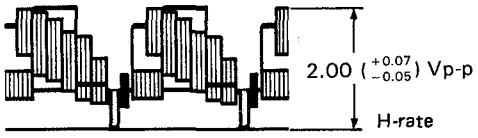


Fig. 2-5-5 PB Y level

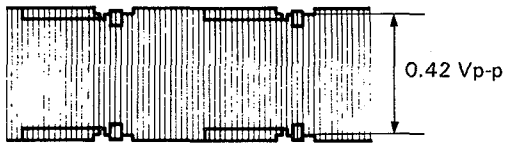
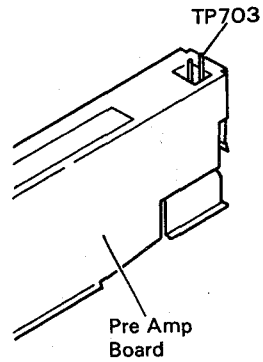


Fig. 2-5-6 REC FM level



No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
6	REC colour level and Ch balance	• PB	• MH-2 colour bar • AUTO tracking off	• IC1-41	• R215 (REC colour) (MAIN board)	1) Connect an oscilloscope to IC1-41 and observe colour signal level. 2) Set the MH-2 alignment tape into the cassette housing, play back the colour bar segment of MH-2 alignment tape. 3) Set the tracking of the FRONT panel to the Auto tracking off position by simultaneously pressing the "V" and "Λ" TV PROG buttons. 4) Adjust by pressing the "V" and "Λ" TV PROG buttons of the Front panel for maximum level of the colour waveform and make a note of the higher colour level "A". 5) Press the STOP button on the FRONT panel and eject the MH-2 alignment tape.
		• REC then PB				6) Set recording video cassette into the cassette housing. Supply a colour bar signal to VIDEO IN. 7) Trigger the oscilloscope externally with the signal from TP411 (DRUM FF) of the Main board. Use (−) trigger for CH1 and (+) triger for CH2. 8) Record a colour bar signal. 9) Play back recorded colour bar signal. Set the tracking of the FRONT panel to the Auto tracking off position by simultaneously pressing the "V" and "Λ" TV PROG buttons and confirm 85 ± 5% of the noted colour level at IC1-41. If necessary, before recording, adjust R215 so that the higher level channel becomes 85 ± 5% of the noted level "A" during playback as shown in Fig. 2-5-7. At this time, confirm that the channel level difference is within 3 dB. **Note:** ***Repeat the above step 9) several times.***

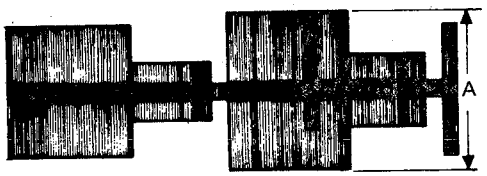


Fig. 2-5-7 REC colour level

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
7	PB Frequency	• REC then PB	•Video sweep •SP •Auto tracking off	•TP210 (MAIN board)	•R208 (PB FREQ) (MAIN board)	1) Terminate VIDEO OUT with monitor - TV (75 Ω load), supply a video sweep signal without burst to VIDEO IN. 2) Set recording video cassette into the cassette housing. Record a video sweep signal without burst in the SP mode. 3) Connect an oscilloscope to TP210. Play back recorded video sweep signal in the SP mode, set the tracking of the Front panel to the Auto tracking off position by simultaneously pressing the (+) and (−) tracking buttons. 4) Use the control of the oscilloscope to position the 100 kHz region at graduation 3 (0 dB) of the oscilloscope scale. 5) Adjust R208 to position the 2 MHz of channel-1 portion at 2.4 ~ 3.0 (−1±1 dB) of the oscilloscope graduations as shown in Fig. 2-5-8. At this time, confirm that the channel difference is within 2 dB.
			•TV broadcast •Auto tracking off	•TV monitor		**Alternate method** 1) Set recording video cassette into the cassette housing, receive a colour broadcast on a VHF channel. 2) Record a colour broadcast that shows a good depiction of human facial contours. 3 Play back recorded colour broadcast, set the tracking of the Front panel to the Auto tracking off position by simultaneously pressing the (+) and (−) tracking buttons. 4) Adjust R208 to obtain distinct facial features on the monitor. **Note:** ***R208 nearly at centre position.***
8	SECAM DET	• EE	•SECAM colour bar	•TP280 (Main board)	•L282 (SECAM DET) (Main board)	1) Connect an oscilloscope to TP280. 2) Adjust L282 so that A and B are related as follows: A : B = 3 : 4

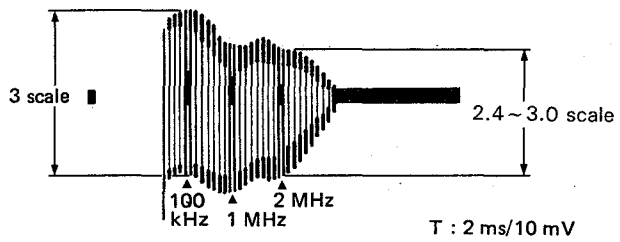


Fig. 2-5-8 PB frequency

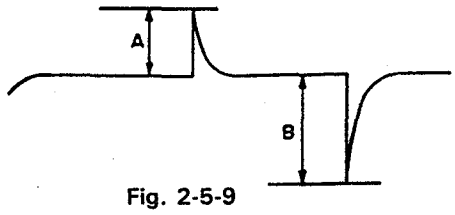


Fig. 2-5-9

2.6 AUDIO CIRCUIT

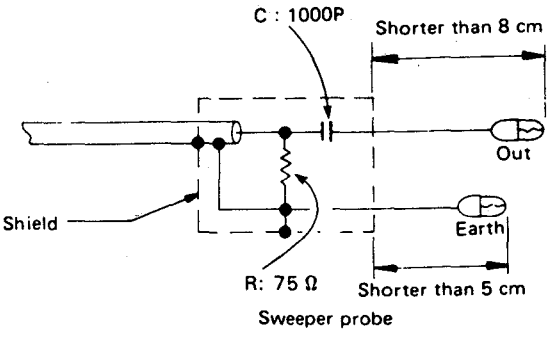
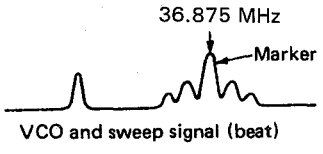
Note: ***Unless otherwise specified, all test points and adjustments are located on the MAIN board.***

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
1	Audio bias level	• REC	•No input signal •AUX	•TP331 (+) •TP332 (−)	•B301, B302 (Bias adj)	1) Set recording video cassette into the cassette housing. 2) Set for the REC mode without all incoming signal. 3) Connect a millivoltmeter between TP331 (INPUT) and TP332 (GND), and confirm 2.6±0.5 mVrms of the bias level at TP331. If necessary, preform the step 4. 4) If level is higher than 2.6±0.5 mV, remove B301. If level is lower than 2.6±0.5 mV, remove B302.

Purpose:
Represent the best compromise of low distortion, extended high-frequency, and high output.
Maladjustment:
Result in poor signal-to-noise ratio and severe distortion.

2.7 TUNER/IF CIRCUIT

Note: ***Unless otherwise specified, all test points and adjustments are located on the TUNER/IF board.***

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
Equipment required: 1. Oscilloscope 2. IF sweep signal generator with suitable markers (PIF, etc.) 3. Sweeper probe (sweep signal supply cable) as shown below.						 **Fig. 2-7-1**
1	VCO	• EE	•Tuner	•IC1-17	•T4 (VCO)	1) Use a sweeper probe as shown in Fig. 2-7-1 and connect the sweep generator output to pin 1 of SAW 1. Adjust the sweep gain so that the waveform does not distort as observed with the oscilloscope. Connect the oscilloscope to pin 17 of IC1 (VIDEO DET OUT) and adjust T4 to align the waveform with the frequency marker as shown in Fig. 2-7-2.
			 VCO and sweep signal (beat) **Fig. 2-7-2**			
			•Tuner •TV broadcast	•TV monitor	•T4 (VCO)	**Alternate method:** 1) Receive a colour broadcast on a VHF-HI channel. 2) Adjust T4 to obtain a fine picture on the monitor.
• **Before the following adjustments:** 1. Connect a cable to ANT IN and terminate TV OUT at 75 Ω. 2. Set a TV channel signal generator as follows. Video: 65 dBμ/75 Ω, colour bar 87.5% modulation Audio: 55 dBμ/75 Ω, 1 kHz ± 50 kHz deviation						
2	RF AGC	• EE	•Tuner •TV broadcast	•TV monitor	•R40 (RF AGC)	1) Connect the oscilloscope to IF terminal of U/V Tuner (Front end). Adjust R40 for maximum level, then again adjust R40 for −8 dB again.
						Alternate method: **Note:** ***Adjust R40 (RF AGC) to correct for excess noise in the picture or when streaky cross interference occurs due to strong electrical fields.*** 1) Adjust R40 to minimize noise or streaks on the TV monitor. 2) Check for absence of abnormality on all channels.

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
3	SOUND DET.	• EE	• Tuner • TV broadcast	•Across C40 (Audio out) Main board	•T2 (Sound det)	1) Use a adjustment circuit as shown in Fig. 2-7-3. and with AFC mode to NORM, connect a distortion meter as shown in Fig. 2-7-3. 2) Adjust T2 for minimum distortion (less than 1.5%).
	Purpose: Set for optimum audio level. Maladjustment: Audio level will either have a small sound or no sound.					
				•Across C40 (Main board)		**Alternate method:** 1) Receive a color broadcast on a VHF-HI channel (7 to 13). Connect an oscilloscope to across C40 of the MAIN board. 2) Adjust T2 for maximum level at audio sound.
4	AFC	• EE	• Tuner • TV broadcast • AFC NORM by MENU	• A (Main board)	•T3 (AFC)	1) With AFC mode to NORM, connect oscilloscope to A of the MAIN board as shown in Fig. 2-7-4. 2) Set the oscilloscope to DC mode and adjust T2 to set the lower edge of the ripple waveform to 2.2 ± 0.2 V.
	Purpose: Keep the local oscillator in the receiver from drifting off proper tuning. (Set for optimum broadcast colour signal) Maladjustment: The picture will eithar have a beat or smear. In some cases it may disappear.					
				• A (Main board)	•T3 (AFC)	**Alternate method:** 1) Receive a color broadcast on a VHF-HI channel (7 to 13). 2) With AFC mode to NORM, connect oscilloscope to A of the MAIN board as shown in Fig. 2-7-4. 3) Set the oscilloscope to DC mode and adjust T3 to set the lower edge of the ripple waveform to 2.2 ± 0.2 V.

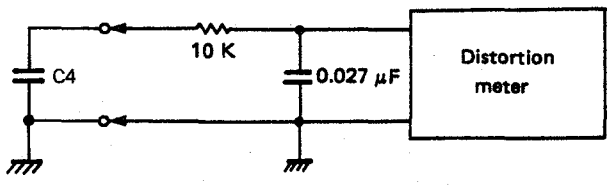


Fig. 2-7-3 Adjustment circuit

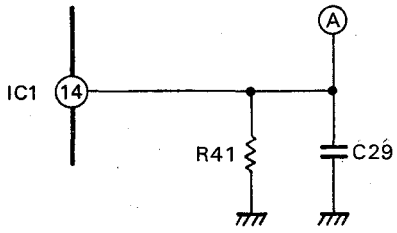
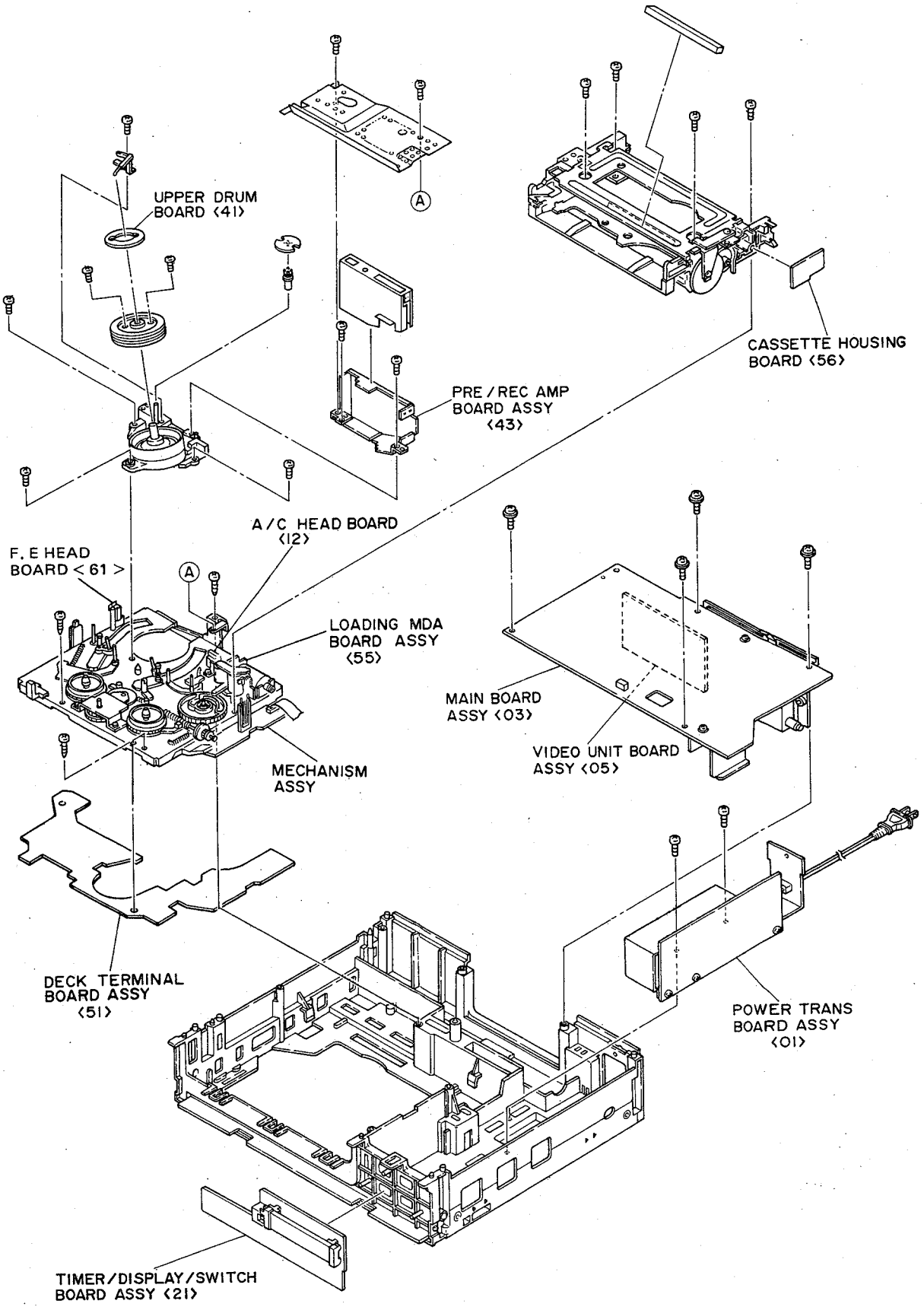


Fig. 2-7-4 Adjustment point

SECTION 3
CHARTS AND DIAGRAMS

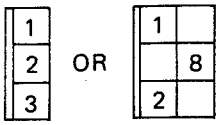
3.1 CIRCUIT BOARD AND LOCATION



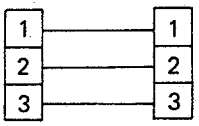
3.2 GENERAL INFORMATION

3.2.1 Connections

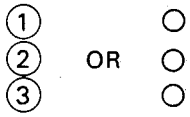
Note:
Unless otherwise specified, only signal input flow is indicated.
Connection arrows indicate only signal outputs.



: Connectors



: Board in connectors



: Direct connections

(VS) (MS) (SM) : Connected pattern in the board.

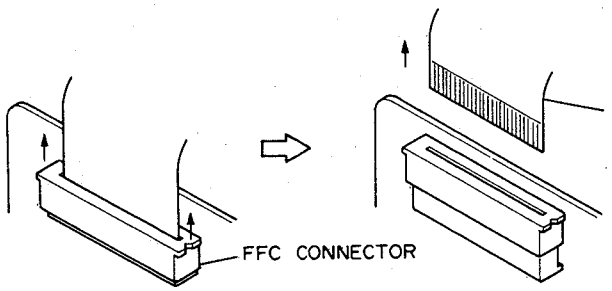
Abbreviations

V : Video	M : Mechacon
S : Servo	A : Audio

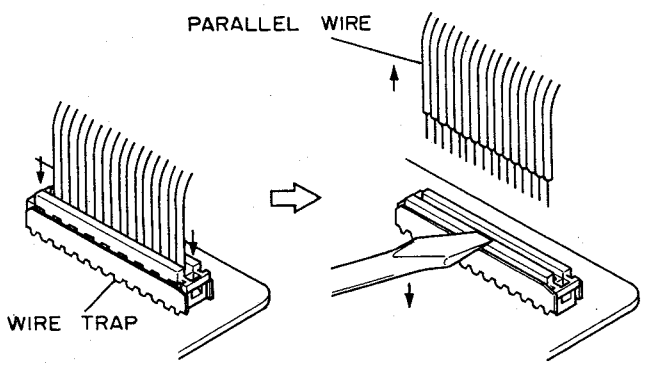
VS : Signal flow from video to servo.

3.2.2 Disconnecting the flatwire

1. Pull the connector structure upward to release the clamp when removing or inserting the flat wire cable.

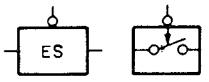


2. Depress the connector structure downward to release the clamp when removing or inserting the flat wire cable, as indicated below.



3.2.3 Indications

AUX : Active only at high.
$\overline{AUX}$: Active only at low.
$\bar{A}U\bar{X}$: Active only at middle.
$\bar{A}UX$: Active only at open.



: Active only at low for electronic switch.

: Active only at high for electronic switch.

: Low pass filter.

: High pass filter.

: Band pass filter.

: Limiter.

: Detector

: Amplifier.

: Mixer stage.

3.2.4 Schematic diagram values

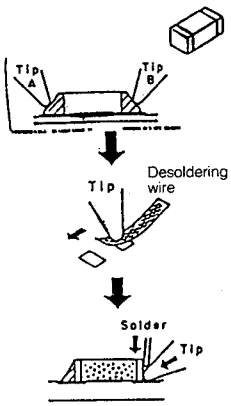
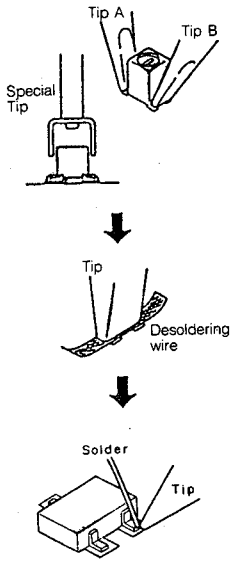
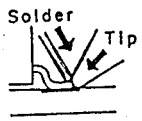
Unless otherwise specified.

1. All resistance values are in ohms, 1/6 W or 1/8 W (refer to parts list).
2. All capacitance values are in μF, (P; PF).
3. All inductance values are in μH, (m; mH).
4. All diodes are 1SS133 or MA165, (refer to parts list).
5. Voltages are DC-measured (reference to ground) with a digital voltmeter during recording (SP mode) and playback (SP mode) with alignment tape. Where voltages differ between recording and playback, the voltage during playback is shown in parenthesis.
6. Waveforms (VIDEO System) are measured (reference to ground) with a color bar during recording (SP mode) and playback (SP mode) with alignment tape.
7. Waveforms (AUDIO System) are measured (reference to ground) with 1 kHz (−8 dBs) during recording and playback with alignment tape (1 kHz).
8. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

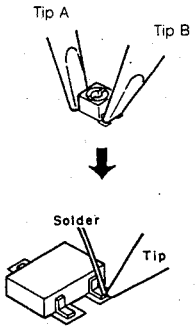
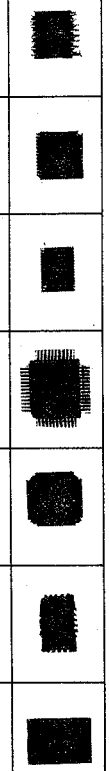
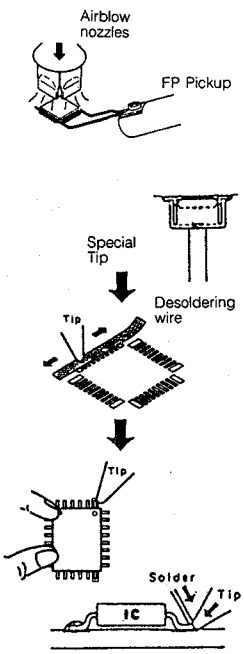
3.2.5 Signal flow in the schematic

Recording signal path
Playback signal path
REC/PB signal path

3.2.6 Basic knowledge of SMC* parts replacement

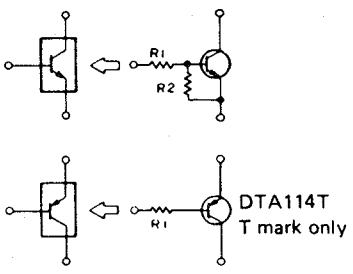
Products	Appearance	Replacement technology	Removal method	Installation method	Soldering tip types	Cautions
Thick Film Chip Resistors Carbon Film Chip Resitors Metal Film Chip Resistors Chip Ceramic Capacitors Chip Triming Resistors			• **Use 2 soldering irons** 1. Use thin tip soldering irons. 2. Use soldering tip temperature of about 280°C. 3. Simultaneously heat both ends of the part. 4. While heating, grasp the part with the tips of the soldering irons and remove it. 5. Use desoldering wire to completely remove the old solder from the part location of the board. 6. A clean pattern for installing the new part is very important.	1. Clean the area where the new part is to be moundted (use alcohol). 2. Apply flux. 3. Set part correctly into position, prevent it from shifting. 4. Bring the soldering iron tip close to the part contact without actually touching it. Melt thin (0.3 mm) solder between the tip and part so that it flows into the part contact. 5. Check work quality with a magnifier.	Thin tip type Small flat-blade tip type 	Some parts can be damaged by sudden heating. Preheat the part at about 100°C for several minutes before installing it. Do not touch the part body with the soldering iron. The thin (0.3 mm) solder for miniature parts does not contain adequate flux. Supplementary flux is thus needed in most cases. Set the position carefully and secure the part. A defective trimming resistor cannot be adjusted externally. Replace with an ordinary variable resistor.
Chip Inductors Chip Resistor Networks Chip Tantalum Capacitors Chip Tantalum Electrolytic Capacitors Chip Aluminum Electrolytic Capacitors Chip Transformers Chip Filters			• **Special desoldering iron** 1. Select soldering tip according to part size. 2. Bring the tip into contact with the soldered points. 3. When the solder melts, remove the part. 4. Remove the old solder with desoldering wire. • **2 soldering irons** 1. Use small flat-blade tips. 2. Heat both ends of the part simultaneously. 3. When the solder melts, grasp and remove the part with the soldering iron tips. 4. Remove the old solder with desoldering wire.	1. Clean the area where the new part is to be mounted (use alcohol). 2. Apply flux. 3. Set part correctly into position, prevent it from shifting. 4. Use sharp soldering iron tip. Bring close to the part contact without actually touching it. Melt thin solder between the tip and part so that it flows into the part contact.  5. Check work quality with a magnifier.	Special Soldering tip Small flat-blade tip type Thin tip type 	Use care not to damage plastic components when soldering. Position the part carefully. This will also affect the soldering operation. Use care regarding soldering iron tip and avoid rapidly heating parts. For larger parts, use a slightly higher temperature (about 300°C). Check after installing (cold solder joints, etc.). Use care not to damage the circuit pattern, especially when removing.

* SMC: Surface Mounted Component

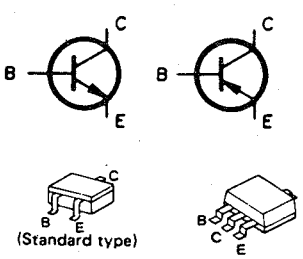
Products	Appear-ance	Replacement technology	Removal method	Installation method	Soldering tip types	Cautions
Chip VRs Chip Trimmer Capacitors Diodes Transistors			• **2 soldering irons** 1. Use small flat-blade tips. 2. Heat the leads of the part simultaneously. 3. When the solder melts, grasp and remove the part with the soldering iron tips. 4. Remove the old solder with desoldering wire.	1. Clean the area where the new part is to be moundted (use alcohol). 2. Apply flux. 3. Set part correctly into position, prevent it from shifting. 4. Use sharp soldering iron tip. Bring close to the part contact without actually touching it. Melt thin solder between the tip and part so that it flows into the part contact.	Thin tip type Small flat-blade tip type 	Use care not to damage the part when soldering. Check for solder joints, expecially miniature parts with small leads.
IC (SOP) (Small Outline Package) IC (SSOP) (Shrink Small Outline Package) IC (VSOP) (Very Small Outline Package) IC (QFP) (Quad Flat Package) IC (VQFP) (Very Small Quad Flat Package) IC (PLCC) (Plastic Leaded Chip Carrier) IC (TSOP) (Thin Small Outline Package)			• **Special desoldering iron** 1. Select the tip according to the size and shape of the IC. 2. "Tin" the tip with a small amount of solder. 3. Set the tip squarely over the IC leads. 4. When the solder melts, carefully twist the iron. 5. Raise and remove the IC. • **Shaped airblower unit** 1. Select the correct nozzle. 2. Select the temperature and airblow (suggested: temp. 7, airblow 4). 3. Engage the IC removing tool. 4. Use the airblow to preheat the IC for about 5 seconds, then heat with the nozzle until the IC remover lifts the part from the board.	1. Use desoldering wire to remove the previous solder. 2. Clean the location with alcohol. 3. Apply flux. 4. Position the IC and solder two pins at opposite sides. 5. Use a sharp tipped soldering iron and carefully solder each pin. (After gaining experience, a thicker tip can be used for better work efficiency.) 6. Remove any solder bridges with desoldering wire. 7. Inspect the work with a magnifier.	Special soldering tips. Airblow nozzles 	Do not reuse removed parts. Use care to avoid solder bridges. Remove any that occurs. Remove the old IC carefully so as not to damage the circuit pattern. Because of the many pins, cleanliness of the pattern is extremely important after removing the IC. Be very precise in positioning the IC. Soldering opposite pins first holds the IC in place and makes soldering the other pins easier. It is important to inspect the work with a magnifier. ICs (especially TSOP) are easily damaged by heat. Do not touch directly with the soldering iron.

3.2.7 Sei iconductors

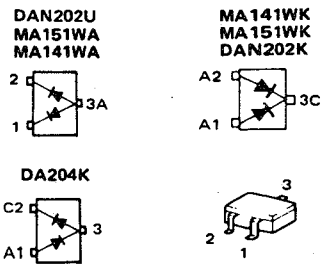
1. Digital transistor



2. Chip transistor



3. Chip diode



Note: The digital transistor includes built in resistors. It features small size and high reliability. Both PNP and NPN types are available.

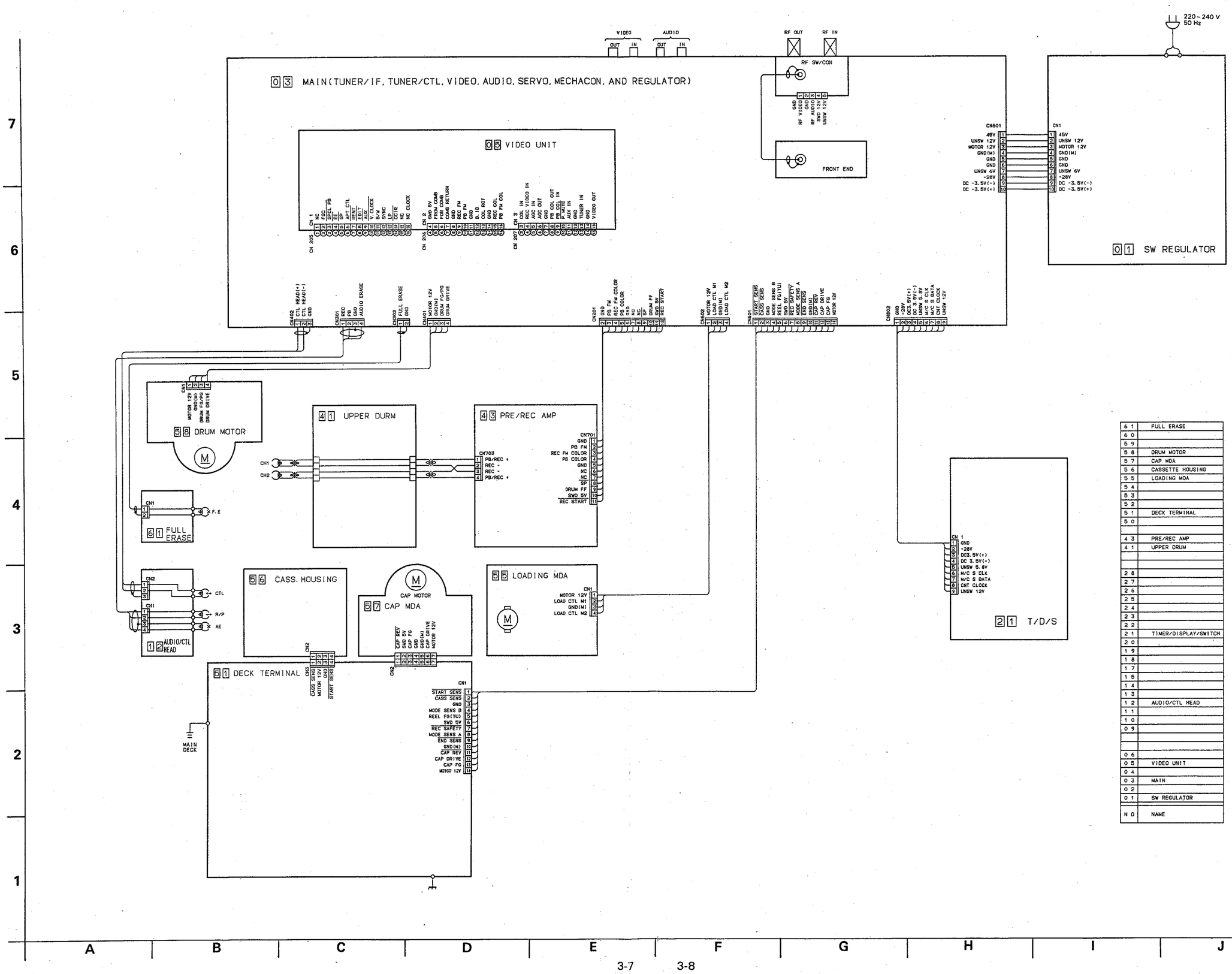
Uses: Inverter, interface, driver circuits.

3.3 ABBREVIATIONS USED IN THE SCHEMATIC DIAGRAMS

A	AC	: Alternating Current
	ACC	: Automatic Color Control
	ACCEL	: Acceleration
	A/C	: Audio/Control
	ADC	: Analog to Digital Converter
	ADD	: Adder
	ADRS	: Address
	ADJ	: Adjustment
	A DUB	: Audio Dubbing
	AE	: Audio Erase
	AFC	: Automatic Frequency Control
	AGC	: Automatic Gain Control
	AH	: Audio Head
	ALC	: Automatic Level Control
	AM	: Amplitude Modulation
	AMP	: Amplifier
	ANT	: Antenna
	APC	: Automatic Phase Control
	ATT	: Attenuator
	AVRG	: Average
	AUD	: Audio
	AUTO	: Automatic
	AUX	: Auxiliary
B	B	: Base
	BAL	: Balance
	BATT	: Battery
	BIT	: Binary Digit
	BLK	: Black, Blanking
	BLU	: Blue
	BILING	: Bilingual
	BPF	: Bandpass Filter
	BT	: Band Tuning
	BUFF	: Buffer
	B/W	: Black and White
C	C	: Collector
	CAP	: Capstan
	CARR	: Carrier
	CASS	: Cassette
	CCD	: Charge Coupled Device
	CD	: Count Down
	CE	: Chip Enable
	CF	: Ceramic Filter
	CFG	: Capstan Frequency Generator
	CH	: Channel
	CHG	: Charge
	CLK	: Clock
	CLR	: Clear
	CMD	: Command
	CNT	: Count
	CNTR	: Counter
	COL	: Color
	COM	: Common
	COMB	: Comb Filter
	COMP	: Comparator Composite Compensation
	CN	: Connector
	CONV	: Converter
	CP	: Circuit Protector
	C-P	: Clamp Pulse
	CPC	: Capstan Phase Control
	CPU	: Central Processing Unit
	CTL	: Control
D	D	: Diode, Drain
	DAC	: Digital to Analog Converter
	dB	: Decibel
	DC	: Direct Current
	DEC	: Decoder
	DEMOD	: Demodulator
	DEMUX	: Demultiplexer
	DET	: Detector
	DFF	: Drum Flip Flop
	DFG	: Drum Frequency Generator
	DEV	: Deviation
	DIF	: Differential
	DISCR	: Discriminator
	DL	: Delay Line
	DOC	: Dropout Compensator
	DOD	: Drop Out Detector
	DPC	: Drum Phase Control
	DST	: Drum Start
E	E	: Emitter
	EE	: Electric to Electric
	EF	: Emitter-Follower
	EMP	: Emphasis
	EN	: Enable
	ENC	: Encoder
	ENV	: Envelope
	EP	: Extended Play
	EQ	: Equalizer
	ES	: Electronic Switch
	ESNS	: End Sensor
	EXP	: Expander
	EXT	: External
F	F	: Farad, Fuse
	F ADV	: Frame Advance
	FDP	: Fluorescent Display Panel
	FE	: Full Erase
	F-E	: Flying Erase
	FET	: Field Effect Transistor
	F-F	: Fast Forward
	FF	: Flipflop
	FG	: Frequency Generator
	FM	: Frequency Modulation
	FMA	: FM Audio
	FR	: Fusible Resistor
	FREC	: Full Recording
	FREQ	: Frequency
	F-V CONV	: Frequency to Voltage Converter
	FWD	: Forward
	FWD S	: Forward Search
G	G	: Gate
	GEN	: Generator
	GND	: Ground
H	H	: High
	HG	: Hall Generator
	HP	: Head Phone
	HPF	: Highpass Filter
	Hz	: Hertz
I	IC	: Integrated Circuit
	ID	: Identification (Pulse)
	IF	: Intermediate Frequency
	IFR	: Infrared
	IFT	: Intermediate Frequency Transformer
	IND	: Indicator
	INH	: Inhibit
	INS	: Insert
	INT	: Internal, Interrupt
	INV	: Inverter
	I/O	: Input/Output

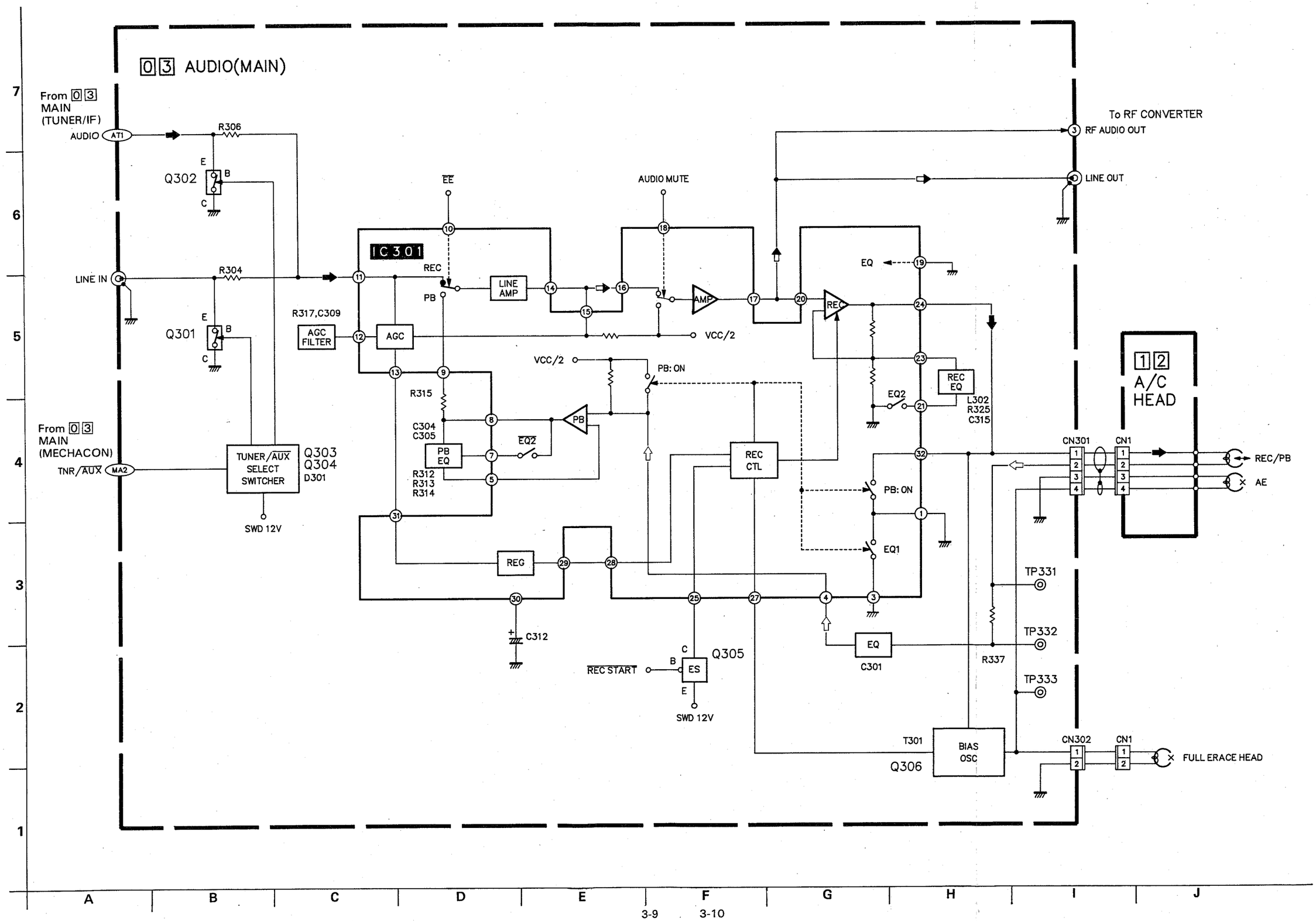
L	L	: Low, Left
	LCD	: Liquid Crystal Display
	LIM	: Limiter
	LIN	: Linearity
	LOAD	: Loading (Cassette)
	LP	: Long Play
	LPF	: Lowpass Filter
M	M	: Motor
	MAX	: Maximum
	MDA	: Motor Drive Amplifier
	MECHACON	: Mechanism Control
	MEM	: Memory
	MIC	: Microphone
	MIN	: Minimum
	MIX	: Mixer
	MM	: Monostable Multivibrator
	MOD	: Modulator
	MODEM	: Modulator-Demodulator
	MON	: Monitor
	MPX	: Multiplexer, Multiplex
	MS	: Mode Select
N	NAND	: Not-And
	NC	: Not Connected
	NFB	: Negative Feedback
	NLN	: Non-Linear
	NOR	: Not-Or
	NORM	: Normal
	NR	: Noise Reduction
O	OP	: Operation
	OPAMP	: Operational Amplifier
	OSC	: Oscillator
P	PB	: Playback
	PC	: Photocoupler
	PCM	: Pulse Code Modulation
	PG	: Pulse Generator
	PGM	: Program
	PI	: Photo Interrupter
	PIF	: Picture Intermediate Frequency
	PLL	: Phase Locked Loop
	POS	: Position
	p-p	: Peak-to-Peak
	PREAMP	: Preamplifier
	P/S	: Pause/Still
	PSC	: Pulse Swallowing Control
	PU	: Pickup
	PUT	: Programmable Unijunction Transistor
	PWM	: Pulse Width Modulation
	PWR	: Power
Q	Q	: Quality Factor
R	R	: Right
	RA	: Resistor Array
	RAE	: Random Access Enable
	RAM	: Random Access Memory
	REC	: Recording
	RECST	: Recording Start
	REF	: Reference
	REG	: Regulated, Regulator
	REM	: Remote
	REMOCON	: Remote Control (Unit)
	REV	: Reverse
	REV S	: Reverse Search
	REW	: Rewind
	ROT	: Rotation
	R/P	: Record/Playback
	RPT	: Repeat
	RST	: Reset
	RT	: Rotary Transformer
	RUN	: Running
	RY	: Relay
S	S	: Serial
	SAP	: Second Audio Program
	SAW	: Surface Acoustic Wave
	SC	: Simulcast
	S-C	: Subcarrier
	SCH	: Search
	SEL	: Select
	SELR	: Selector
	SENS	: Sensor
	SEP	: Separator
	SF	: Source Follower
	SFF	: Short Fast Forward
	SIF	: Sound Intermediate Frequency
	SHARP	: Sharpness
	SN	: Signal to Noise Ratio
	SP	: Standard Play
	SPCL	: Special
	SREV	: Search Reverse
	SREW	: Short Rewind
	S/S	: Slow/Still
	SSG	: Sync Signal Generator
	SSNS	: Start Sensor
	ST	: Stereo
	STD	: Strobe Data, Standard
	SUP	: Supply
	SW	: Switch
	SWD	: Switched
	SYNC	: Synchronization
T	TF	: Thermal Fuse
	TIM	: Timing
	TK	: Tracking
	TNR	: Tuner
	TP	: Test Point
	TPZD	: Trapezoid
	TR	: Trimmer
	TRANS	: Transformer
	T/T	: Tuner/Timer
	TU	: Take-up
U	UL	: Unloading
	UNREG	: Unregulated
	UNSW	: Unswitch
V	V	: Vertical, Volt
	VCO	: Voltage Controlled Oscillator
	VD	: Vertical Drive
	VFF	: Video Flip Flop
	VIF	: Video Intermediate Frequency
	VP	: Vertical Pulse
	VR	: Variable Resistor
	VS	: Video and Sync
	VSCH	: Variable Search
	V/T	: Video/Television
	V/U	: VHF/UHF
	VXO	: Variable Crystal Oscillator
W	W	: Watt
	W & D	: White and Dark
	WHT	: White
X	XTAL	: Crystal
Y	Y	: Luminance
	Y/C	: Luminance/Chrominance
	YEL	: Yellow

3.4 BOARD INTERCONNECTIONS

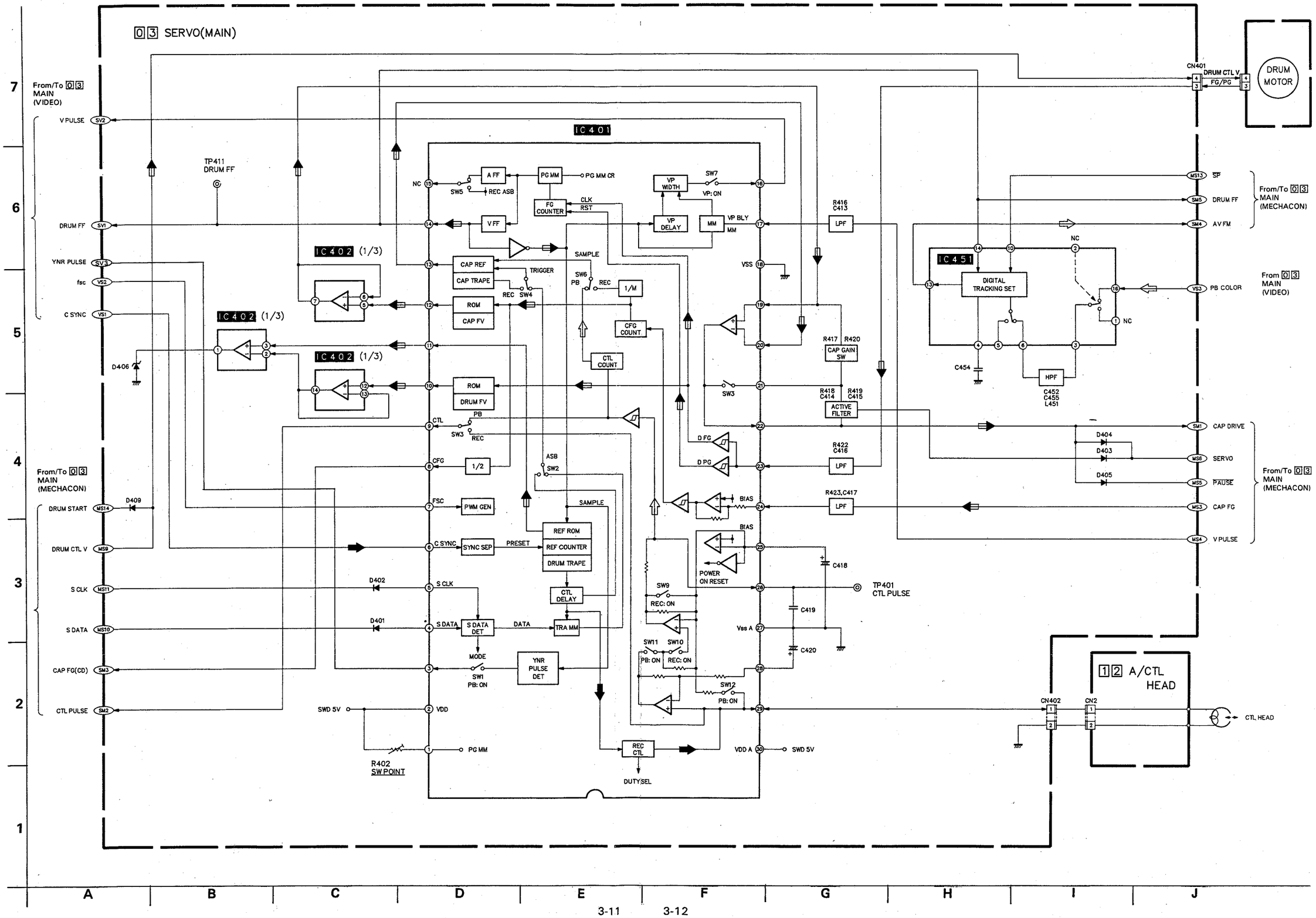


61	FULL ERASE
60	
59	
58	DRUM MOTOR
57	CAP MDA
56	CASSETTE HOUSING
55	LOADING MDA
54	
53	
52	
51	DECK TERMINAL
50	
43	PRE/REC AMP
41	UPPER DRUM
28	
27	
26	
25	
24	
23	
22	
21	TIMER/DISPLAY/SWITCH
20	
19	
18	
17	
15	
14	
13	
12	AUDIO/CTL HEAD
11	
10	
09	
06	
05	VIDEO UNIT
04	
03	MAIN
02	
01	SW REGULATOR
NO	NAME

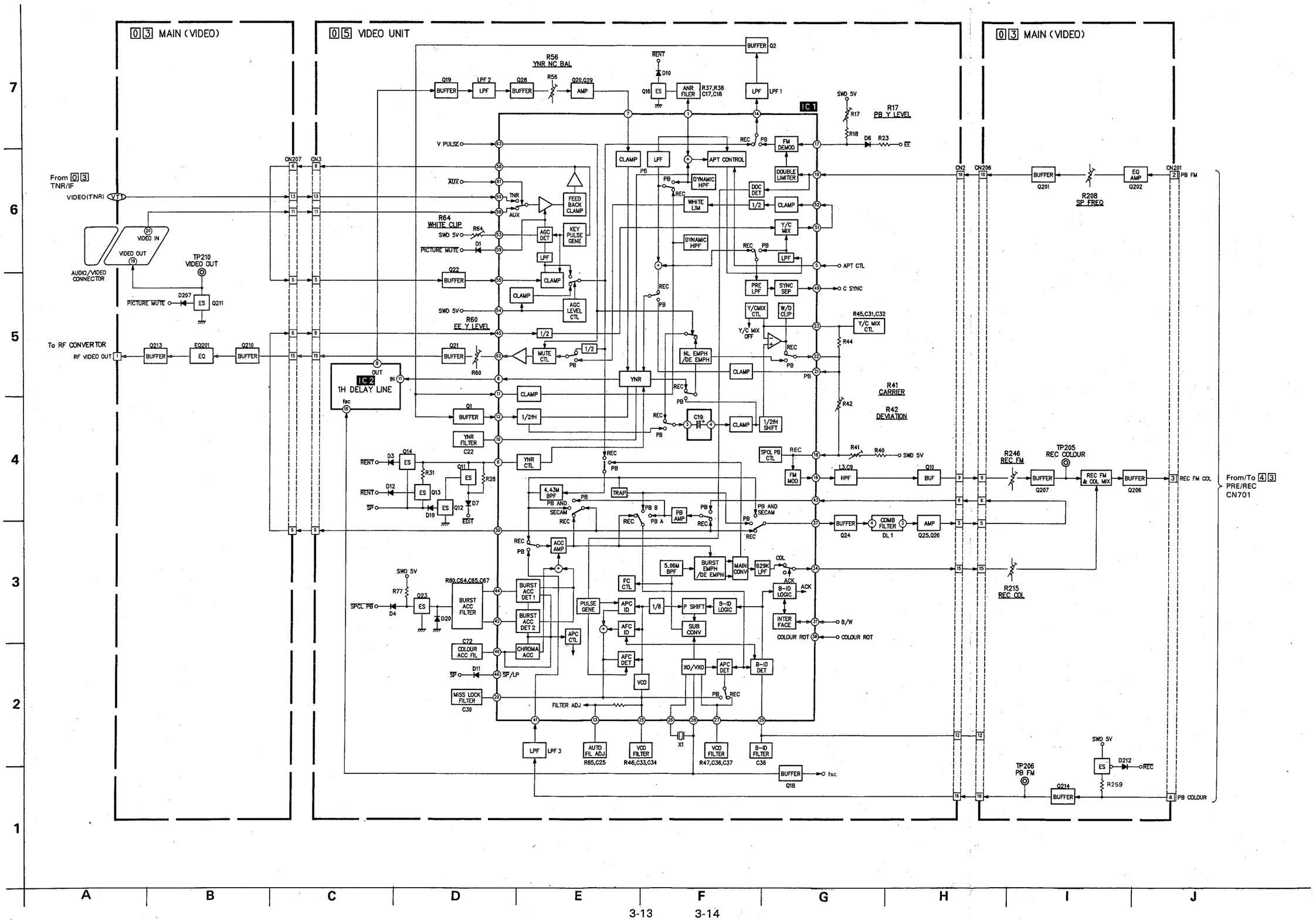
3.5 AUDIO BLOCK DIAGRAM



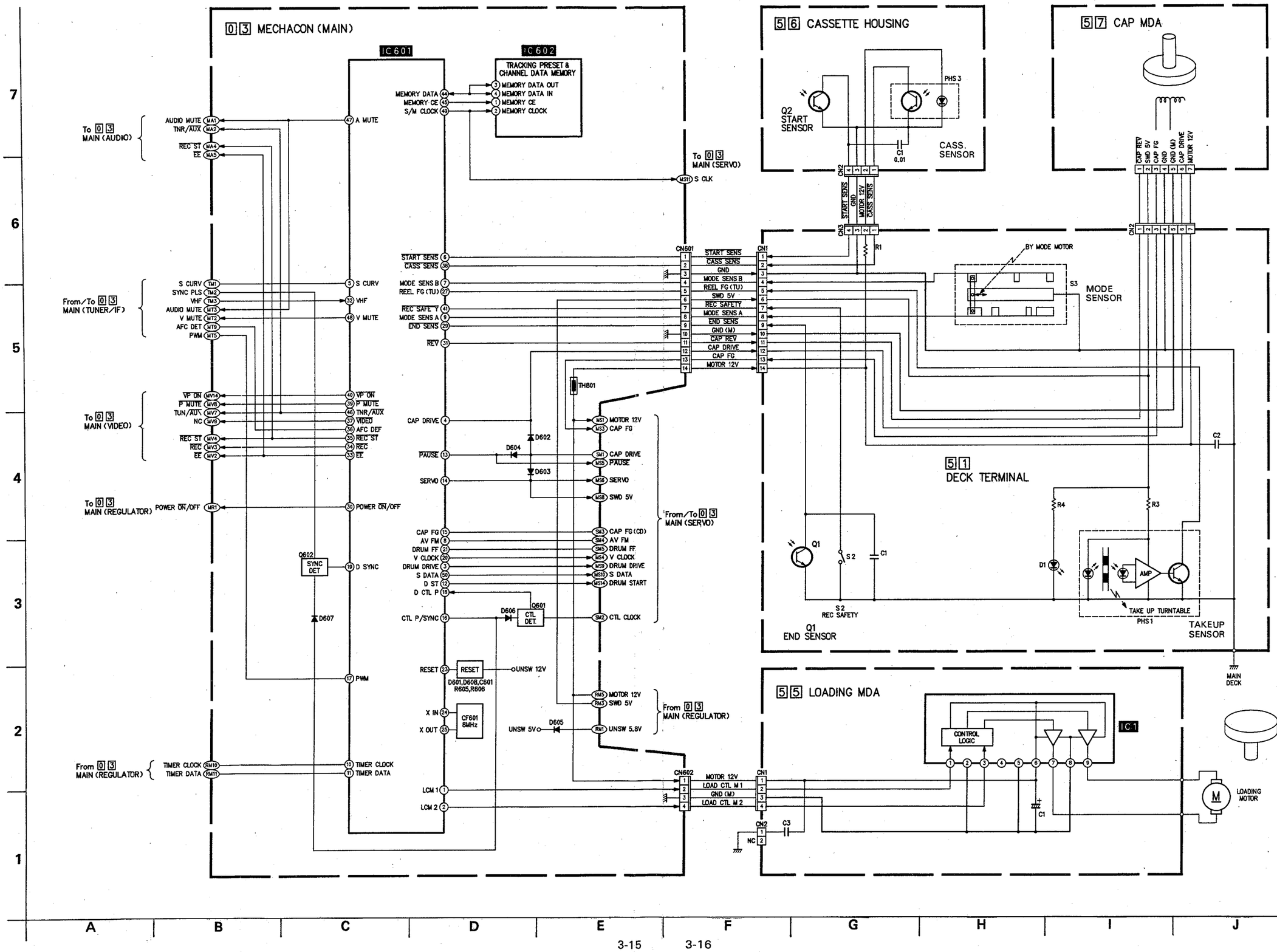
3.6 SERVO BLOCK DIAGRAM



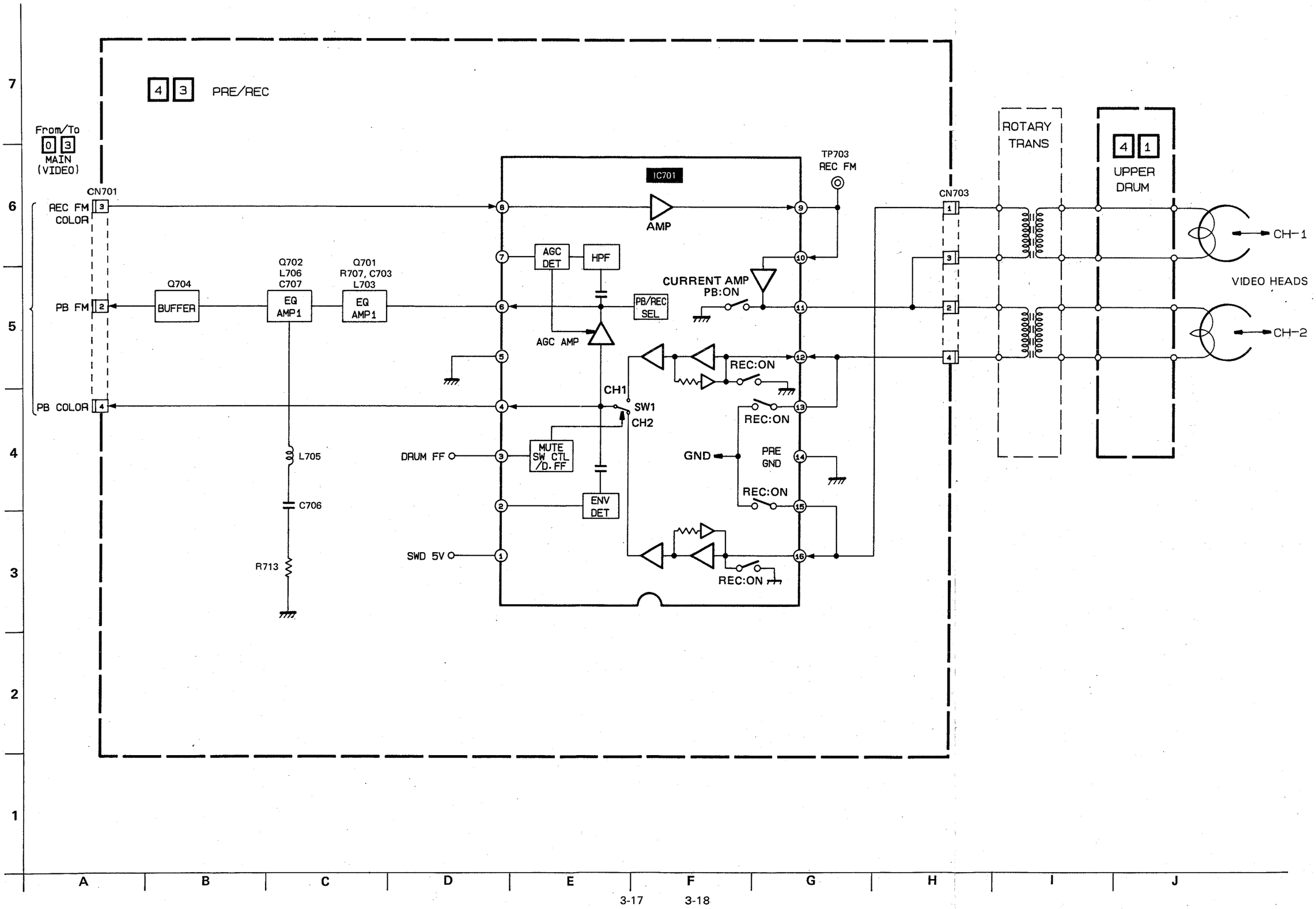
3.7 VIDEO BLOCK DIAGRAM



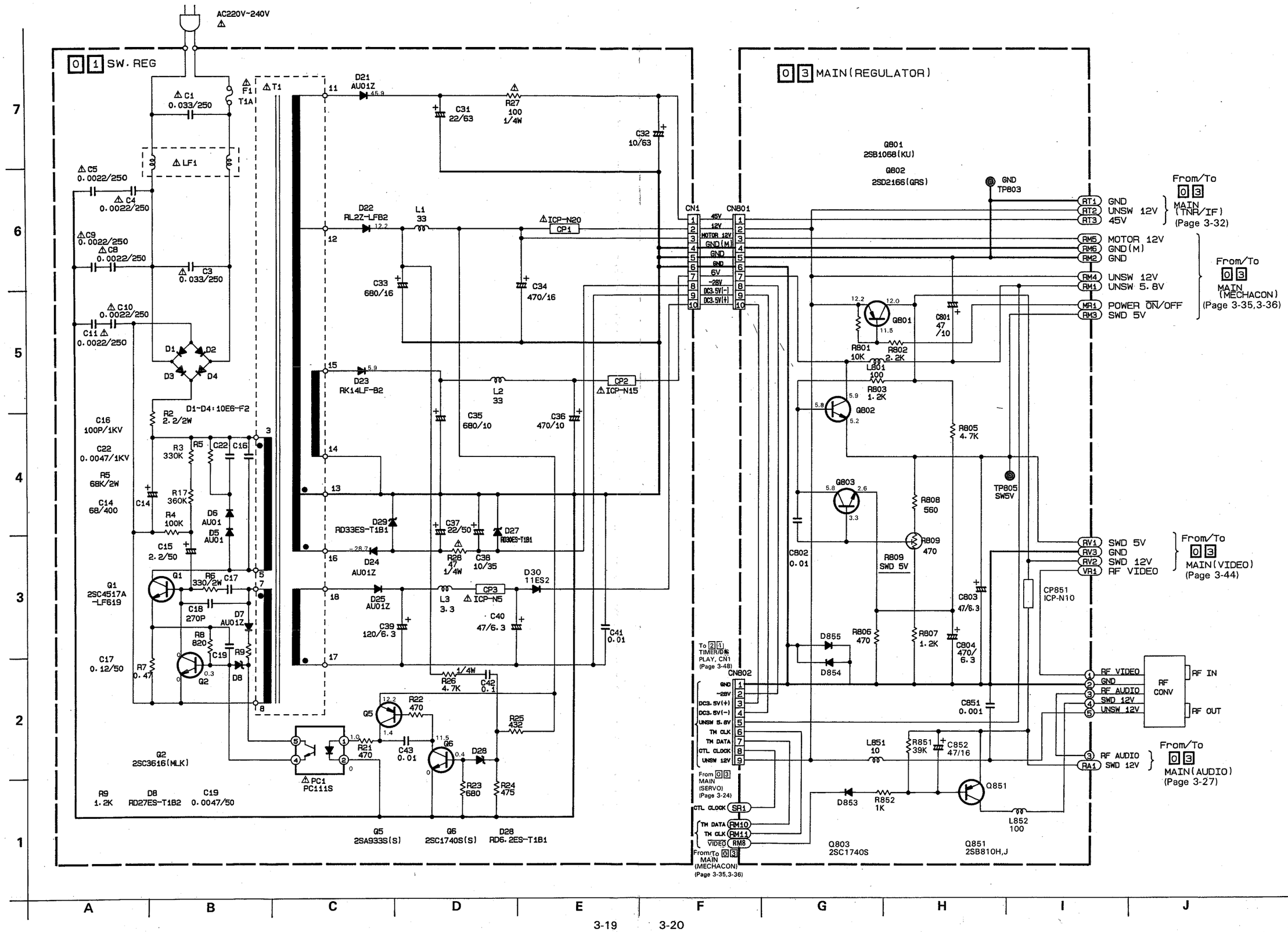
3.8 SYSTEM BLOCK DIAGRAM



3.9 PRE/REC BLOCK DIAGRAM

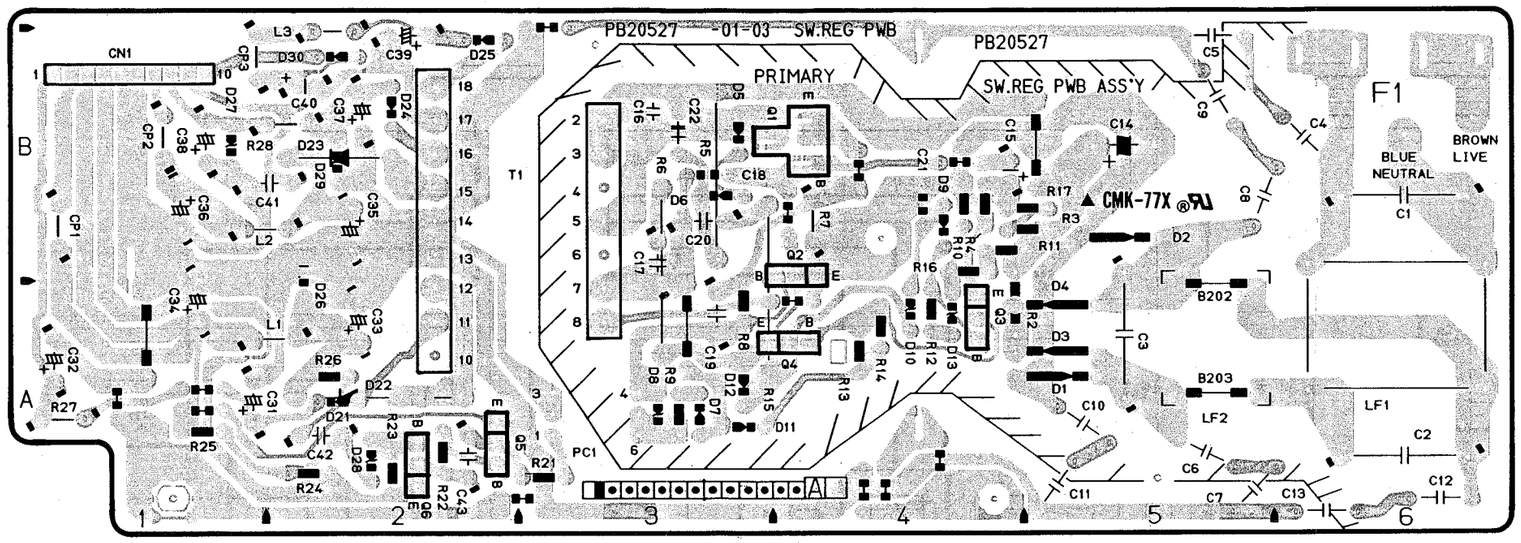


3.10 SWITCH REGULATOR AND REGULATOR (MAIN) SCHEMATIC DIAGRAMS

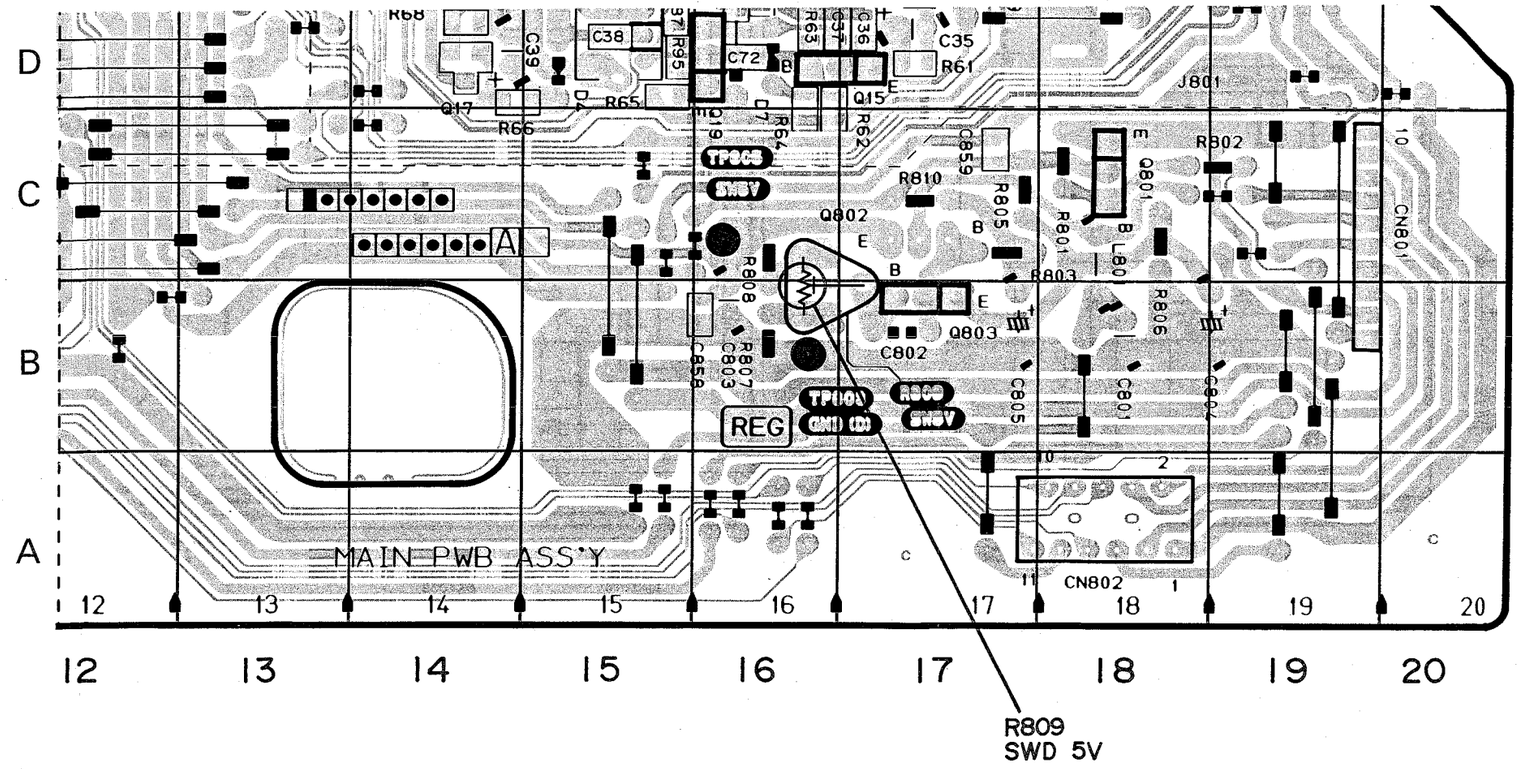


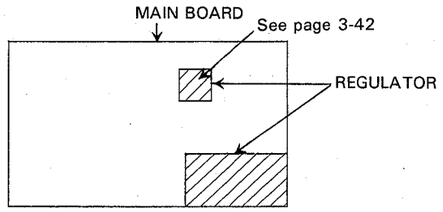
3.11 SWITCHING REGULATOR CIRCUIT BOARD

—SW REGULATOR—



—REGULATOR (MAIN)—





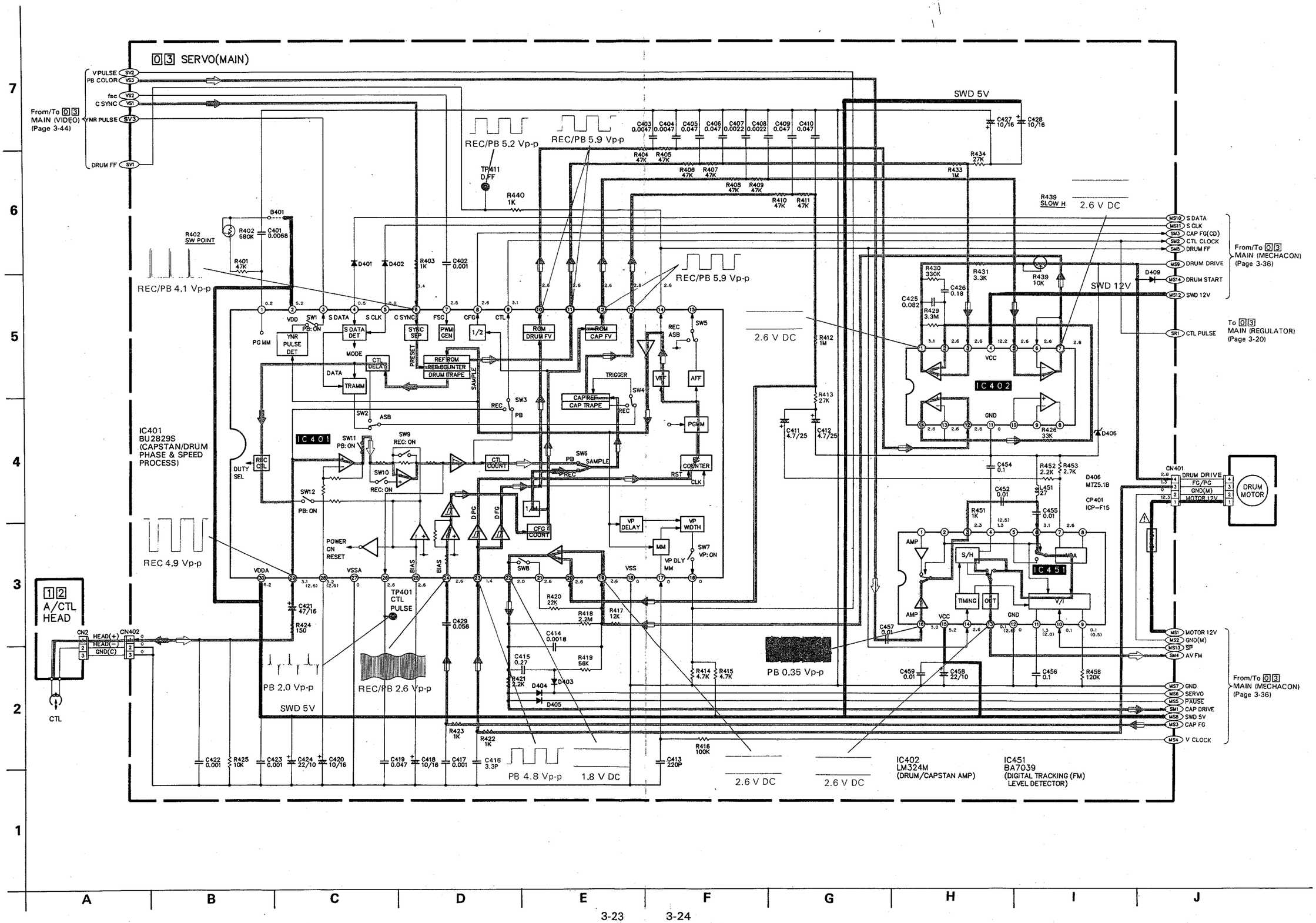
• MAIN board assembly is located in page 3-41,42

·Only chip parts

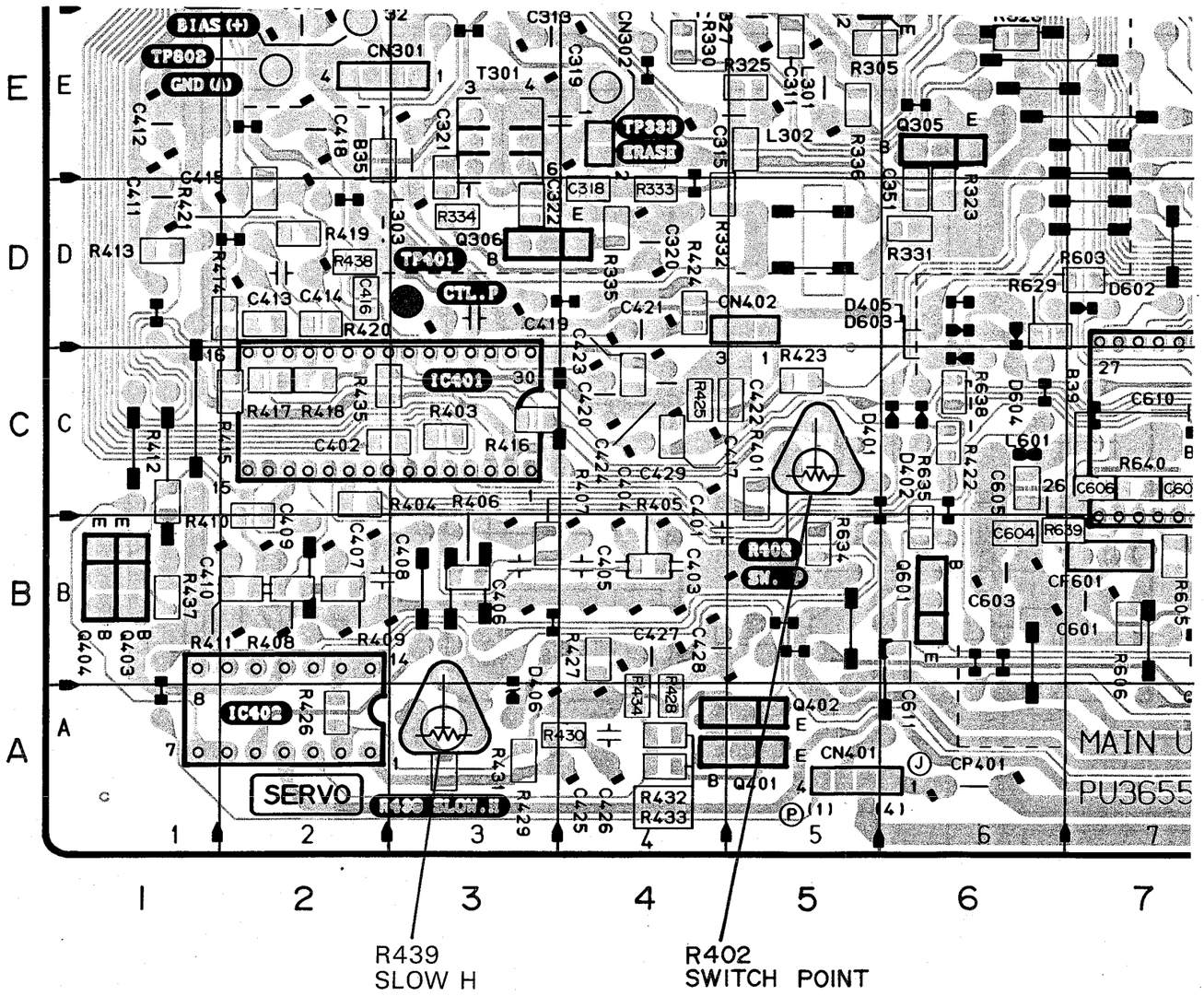
REF No.	LOCATION
CAPACITOR	
C854 C856	J11 J11
C858 C859	B16 C17

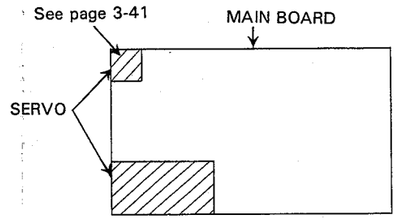
see page 3-42

3.12 SERVO SCHEMATIC DIAGRAM



3.13 SERVO (MAIN) CIRCUIT BOARD





• MAIN board assembly is located in page 3-41,42

· Only chip parts

REF No.	LOCATION	REF No.	LOCATION
RESISTOR		RESISTOR	
R401	C5	R452	J2
R403	C3	R453	I2
R404	B2	R458	K1
R406	B3		
R407	B3		
R408	B2	CAPACITOR	
R409	B2		
R410	C2	C402	C2
R411	B2	C413	D2
R412	C1	C416	D2
R413	D1	C417	C4
R414	D1	C422	C4
R415	C2	C423	C4
R416	C3	C452	J3
R417	C2	C455	J2
R418	C2	C457	J3
R419	D2	C459	K2
R420	D2		
R421	D2		
R422	C6		
R423	C5		
R424	D4		
R425	C4		
R426	A2		
R429	A3		
R430	A3		
R431	A3		
R433	A4		
R434	A4		
R440	H1		
R451	J2		

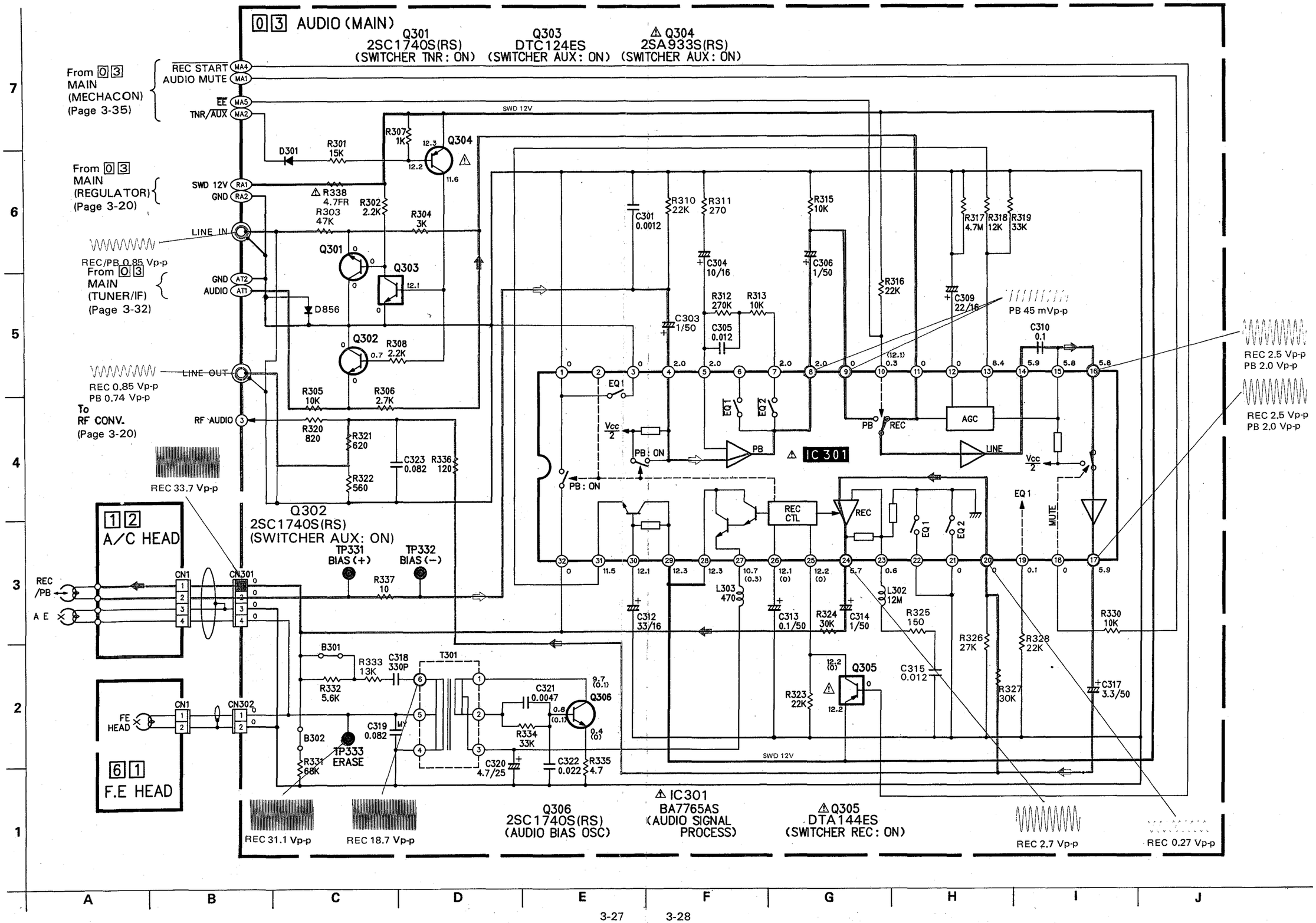
see page 3-41

see page 3-41

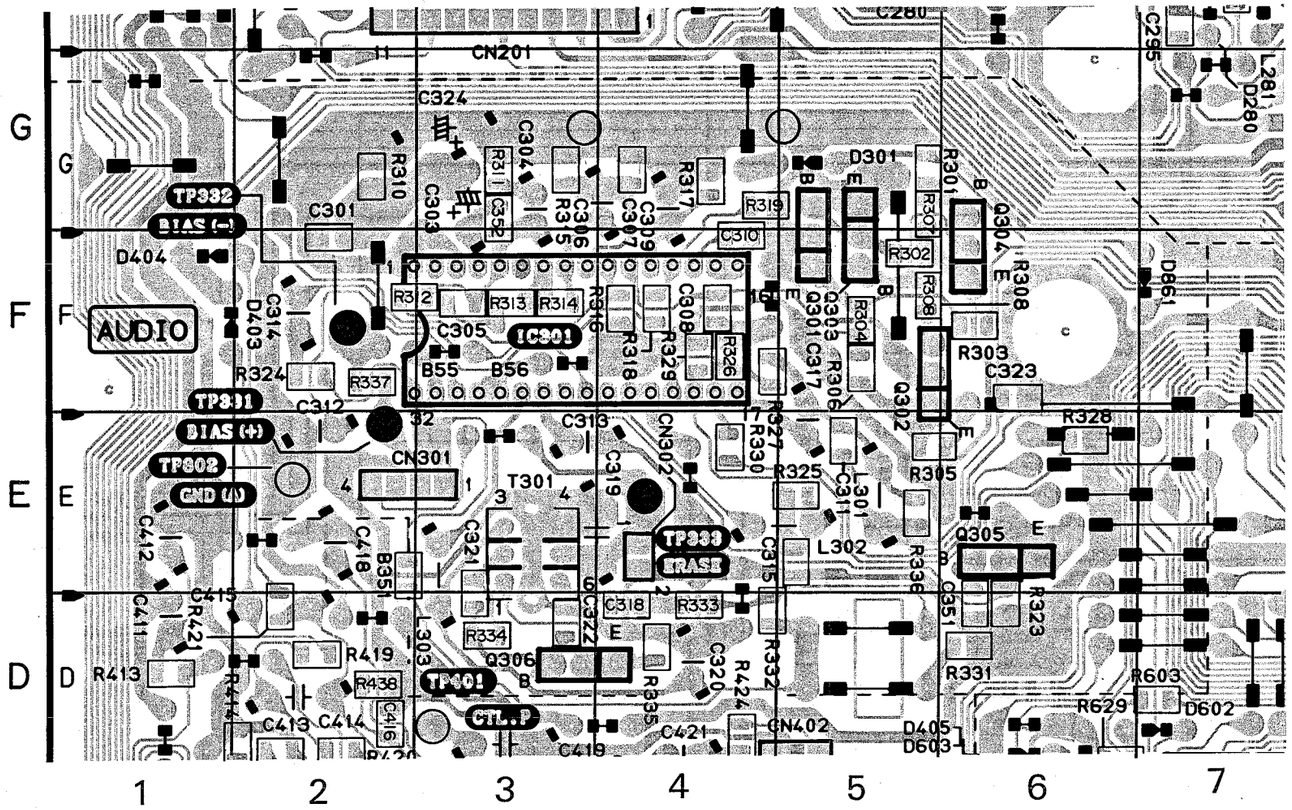
see page 3-41

3.14 AUDIO SCHEMATIC DIAGRAM

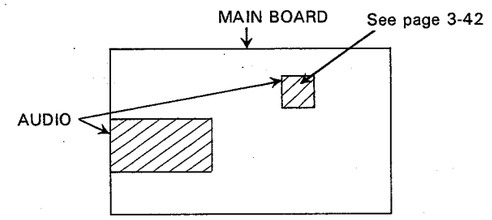
NOTE: Shaded (▒) parts are critical for safety. Replace only with specified part numbers.



3.15 AUDIO (MAIN) CIRCUIT BOARD



see page 3-42

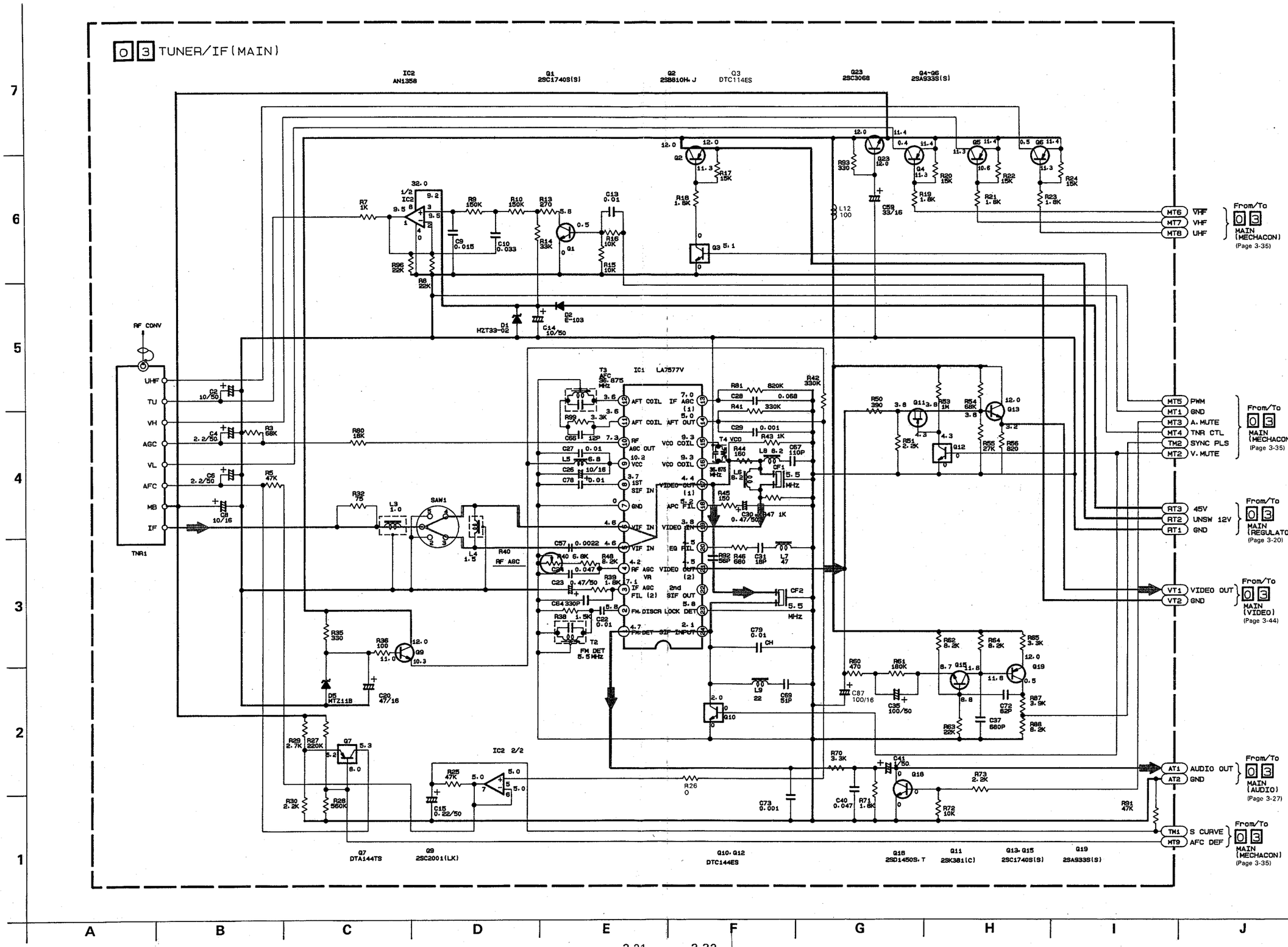


• MAIN board assembly is located in page 3-41,42

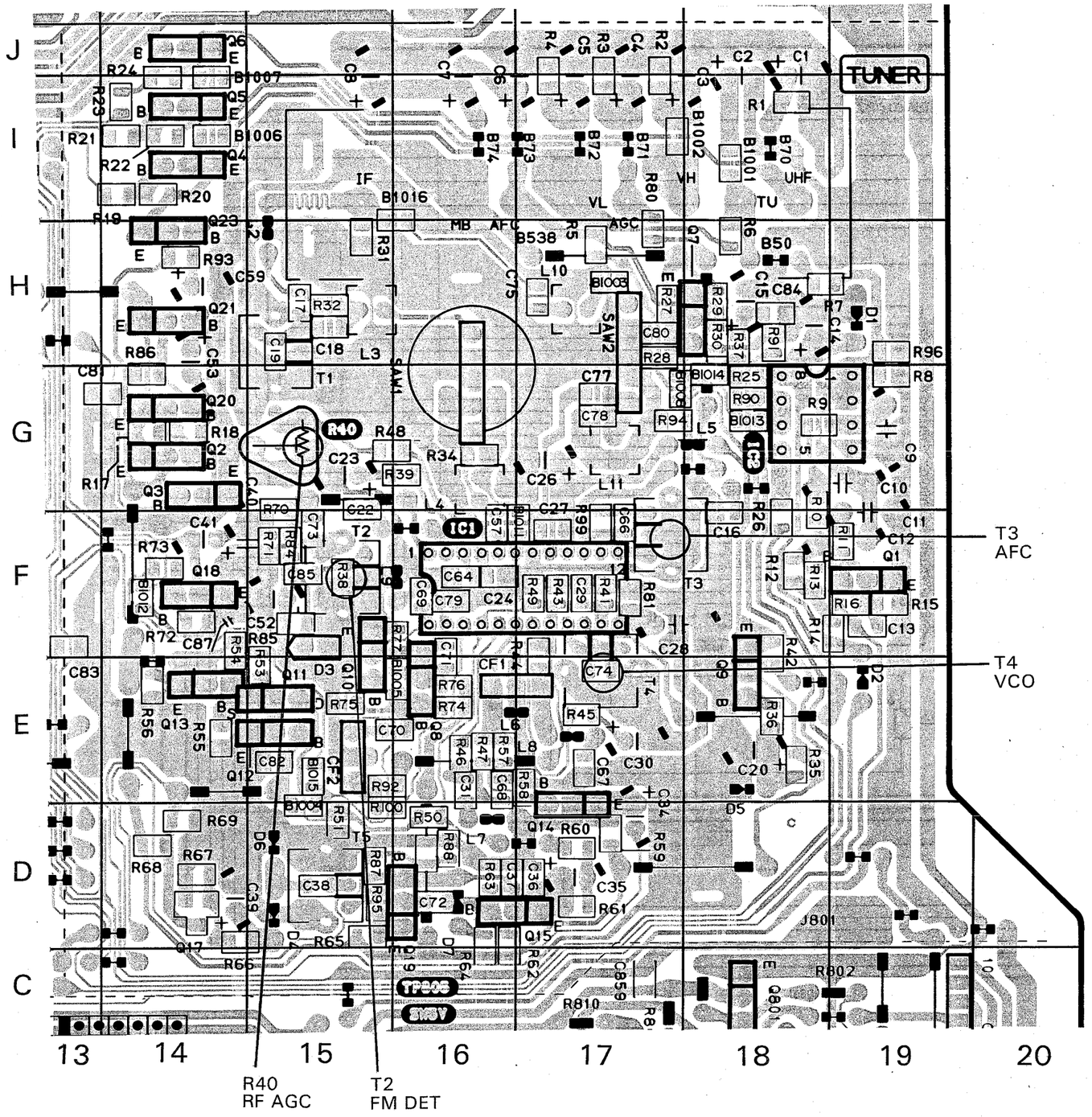
· Only chip parts

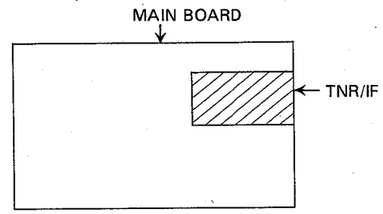
REF No.	LOCATION	REF No.	LOCATION
RESISTOR		RESISTOR	
R301	G5	R335	D4
R302	F5	R336	E5
R303	F6	R337	F2
R304	F5		
R305	E5		
R306	F5	CAPACITOR	
R307	G5		
R308	F5	C301	F2
R310	G2	C305	F3
R311	G3	C310	G4
R312	F2	C315	E5
R313	F3	C318	D4
R315	G3	C321	E3
R316	F4	C322	D3
R317	G4	C323	F6
R318	F4	C351	D6
R319	G4	C352	G3
R320	I12		
R321	I12		
R322	J12		
R323	D6		
R324	F2		
R325	E5		
R326	F4		
R327	F4		
R328	E6		
R330	E4		
R331	D6		
R332	D4		
R333	D4		
R334	D3		

3.16 TUNER/IF (MAIN) SCHEMATIC DIAGRAM



3.17 TUNER/IF (MAIN) CIRCUIT BOARD



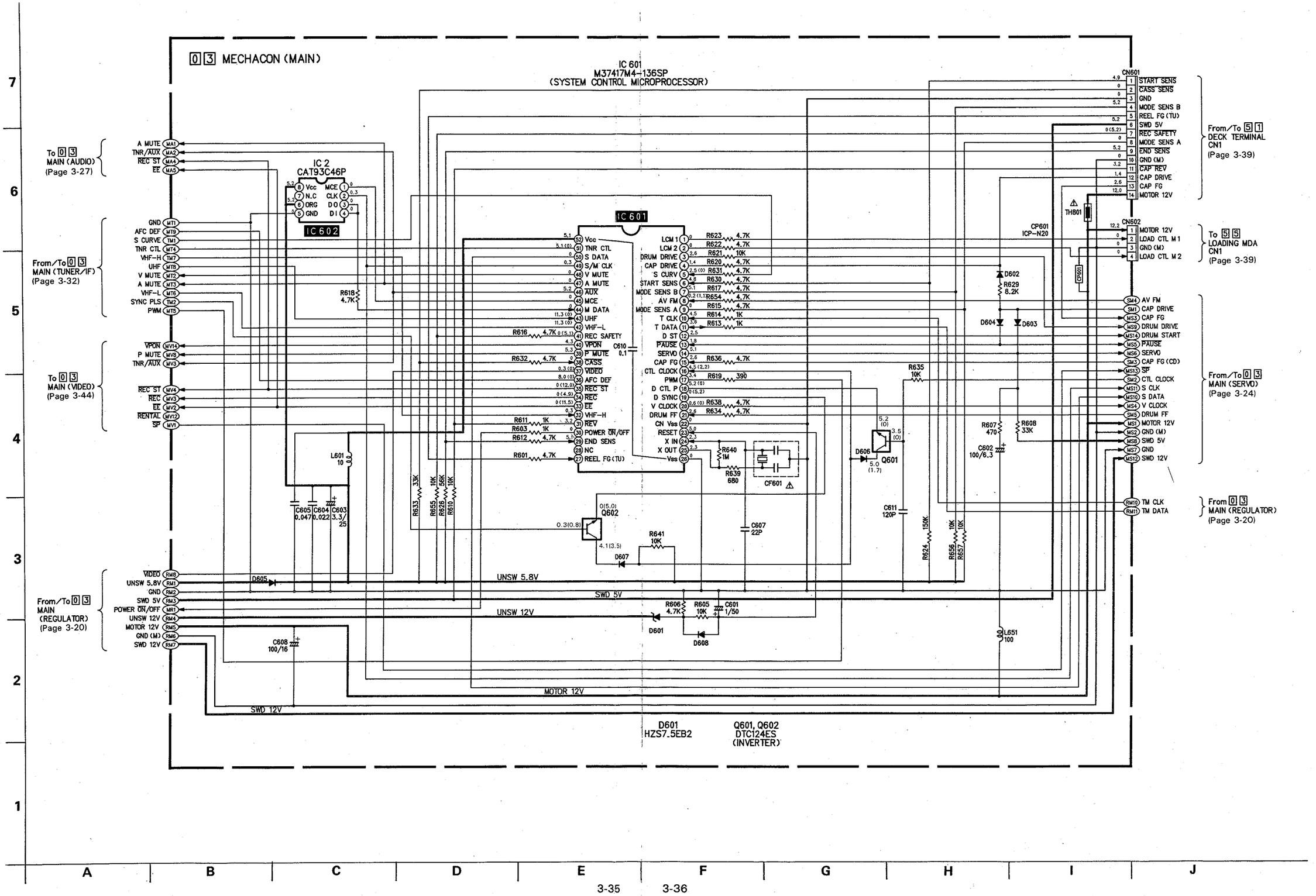


• MAIN board assembly is located in page 3-41,42

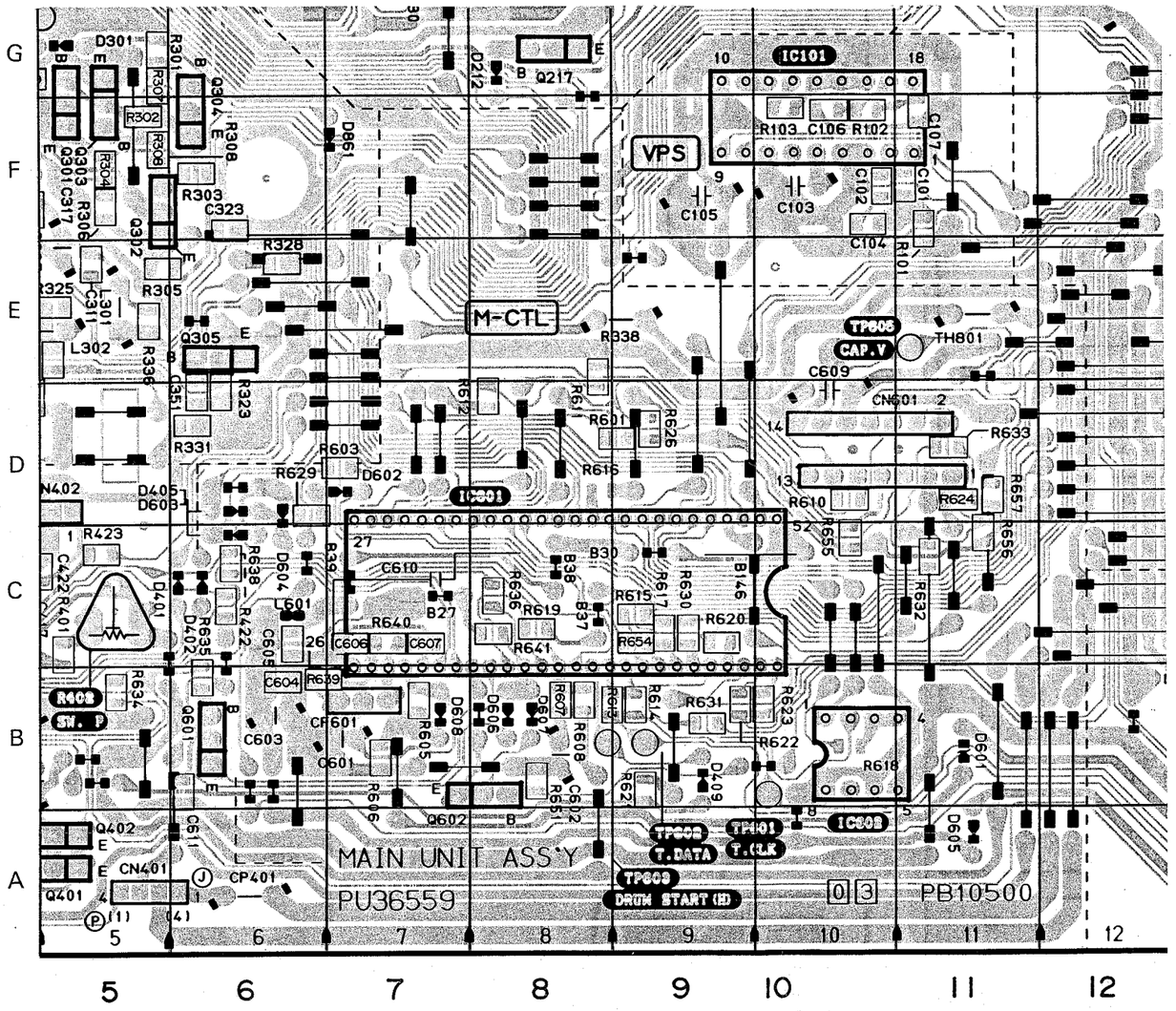
· Only chip parts

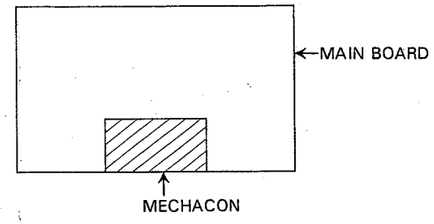
REF No.	LOCATION	REF No.	LOCATION	REF No.	LOCATION	REF No.	LOCATION
RESISTOR		RESISTOR		RESISTOR		CAPACITOR	
R3	I17	R39	G16	R91	H18	C82	E15
R5	H17	R41	F17	R92	E15	C83	F13
R7	H18	R42	E18	R93	H14	C84	H18
R8	G19	R43	F17	R96	H19		
R9	G18	R44	E17	R99	F17		
R10	F18	R45	E17				
R11	F19	R46	E16				
R12	F18	R47	E16	CAPACITOR			
R13	F18	R48	G16				
R14	F18	R50	D16	C13	F19		
R15	F19	R51	D15	C17	H15		
R16	F19	R53	E15	C18	H15		
R17	G14	R54	F14	C22	G15		
R18	G14	R55	E14	C24	F16		
R19	I14	R56	E14	C27	F17		
R20	I14	R60	D17	C29	F17		
R21	I14	R61	D17	C31	E16		
R22	I14	R62	C16	C57	F16		
R23	I14	R63	D16	C64	F16		
R24	I14	R64	C16	C66	F17		
R25	G18	R65	D15	C67	E17		
R26	F18	R70	G15	C68	E16		
R27	H17	R71	F15	C69	F16		
R28	H17	R72	F14	C70	E16		
R29	H18	R73	F14	C71	E16		
R30	H18	R75	E15	C73	F15		
R32	H15	R80	H17	C77	G17		
R35	E18	R81	F17	C78	G17		
R36	E18	R87	D15	C79	F16		
R37	H18	R88	D16	C80	H17		
R38	F15	R90	G18	C81	G14		

3.18 SYSTEM CTL SCHEMATIC DIAGRAM



3.19 MECHACON (MAIN) CIRCUIT BOARD



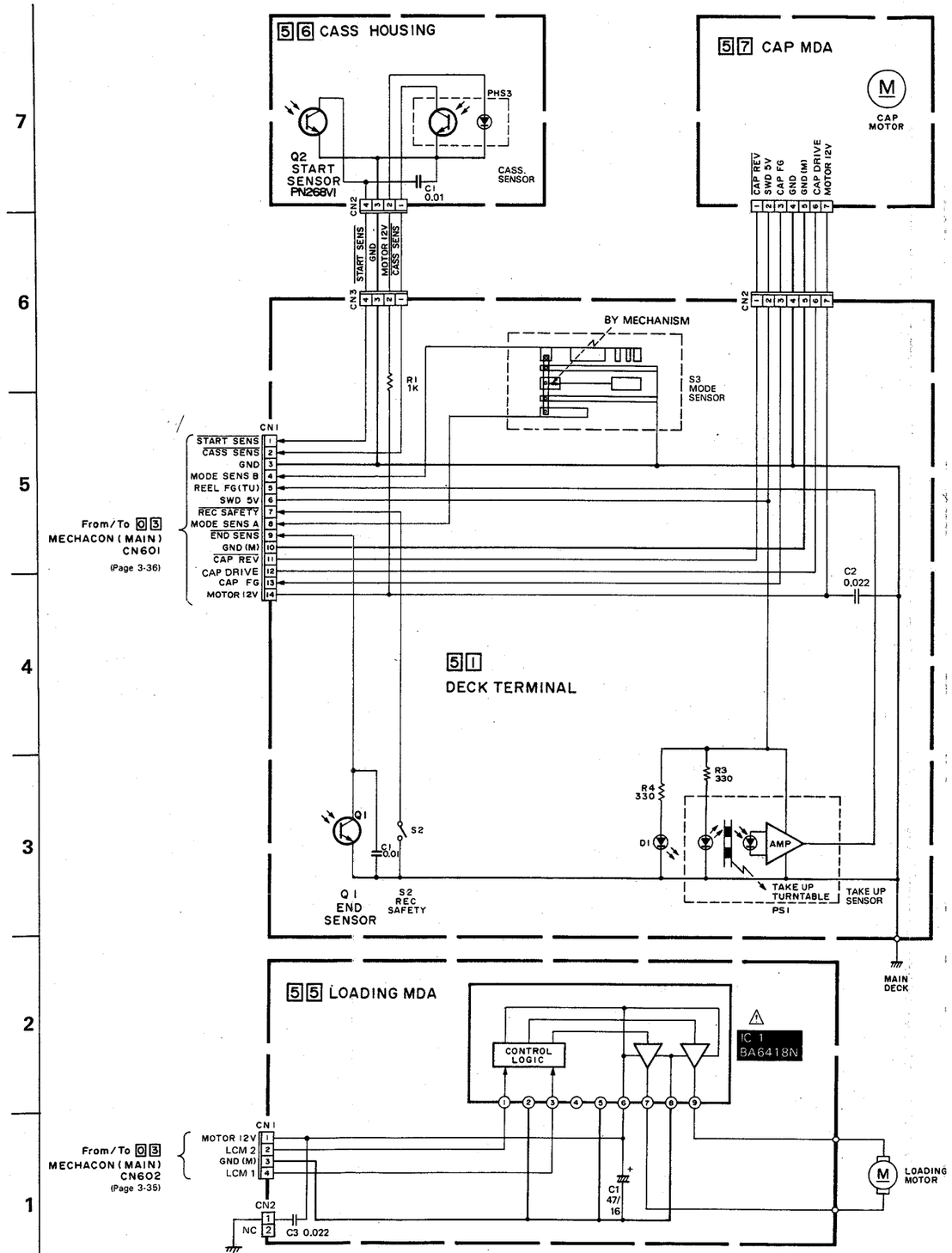


• MAIN board assembly is located in page 3-41,42

· Only chip parts

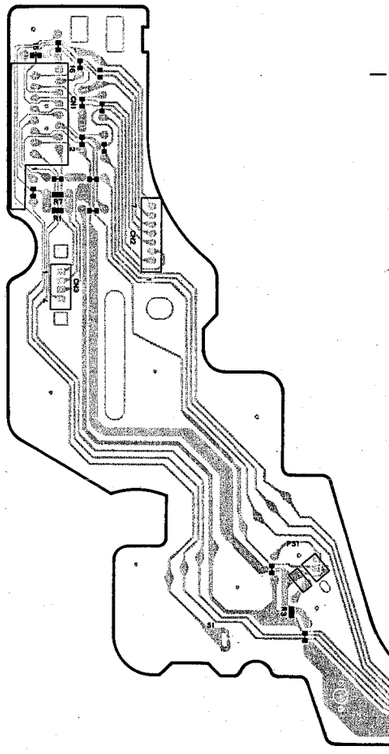
REF No.	LOCATION	REF No.	LOCATION
RESISTOR		RESISTOR	
R101	F11	R635	B6
R102	F10	R636	C8
R103	F10	R638	C6
R601	D9	R639	B6
R603	D7	R640	C7
R605	B7	R641	C8
R606	B7	R654	C9
R607	B8	R655	C10
R608	B8	R656	C11
R610	D10	R657	D11
R611	D8		
R612	D8		
R613	B8	CAPACITOR	
R614	B9		
R615	C9	C101	F11
R616	D8	C102	F10
R617	C9	C104	F10
R618	B10	C106	F10
R619	C8	C107	F11
R620	C9	C604	B6
R621	B9	C605	C6
R622	B9	C607	C7
R623	B10	C611	B6
R624	D11		
R626	D9		
R629	D6		
R630	C9		
R631	B9		
R632	C11		
R633	D11		
R634	B5		

3.20 DECK TERMINAL, CASS. HOUSING, CAPSTAN MDA AND LOADING MDA SCHEMATIC DIAGRAMS

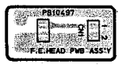


3.21 DECK TERMINAL, LOADING MDA, CASS. HOUSING A/CTL HEAD AND FULL ERASE HEAD CIRCUIT BOARDS

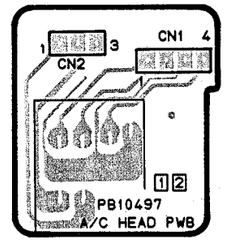
— DECK TERMINAL —

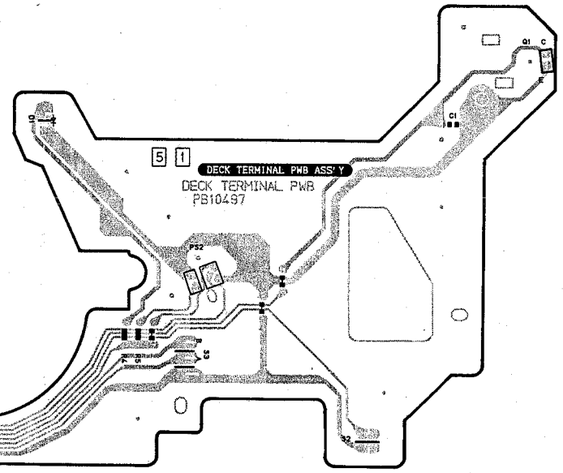


—FULL ERASE HEAD—

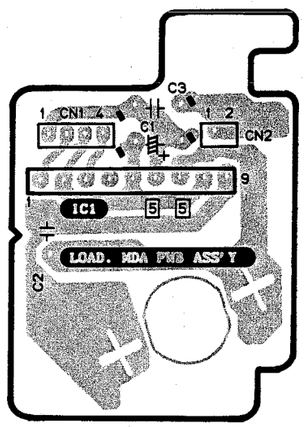


—A/CTL HEAD—

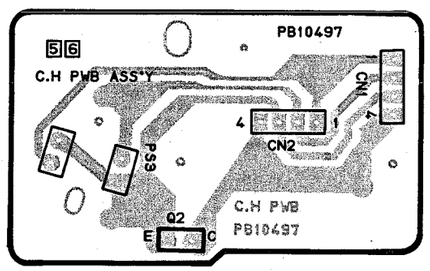




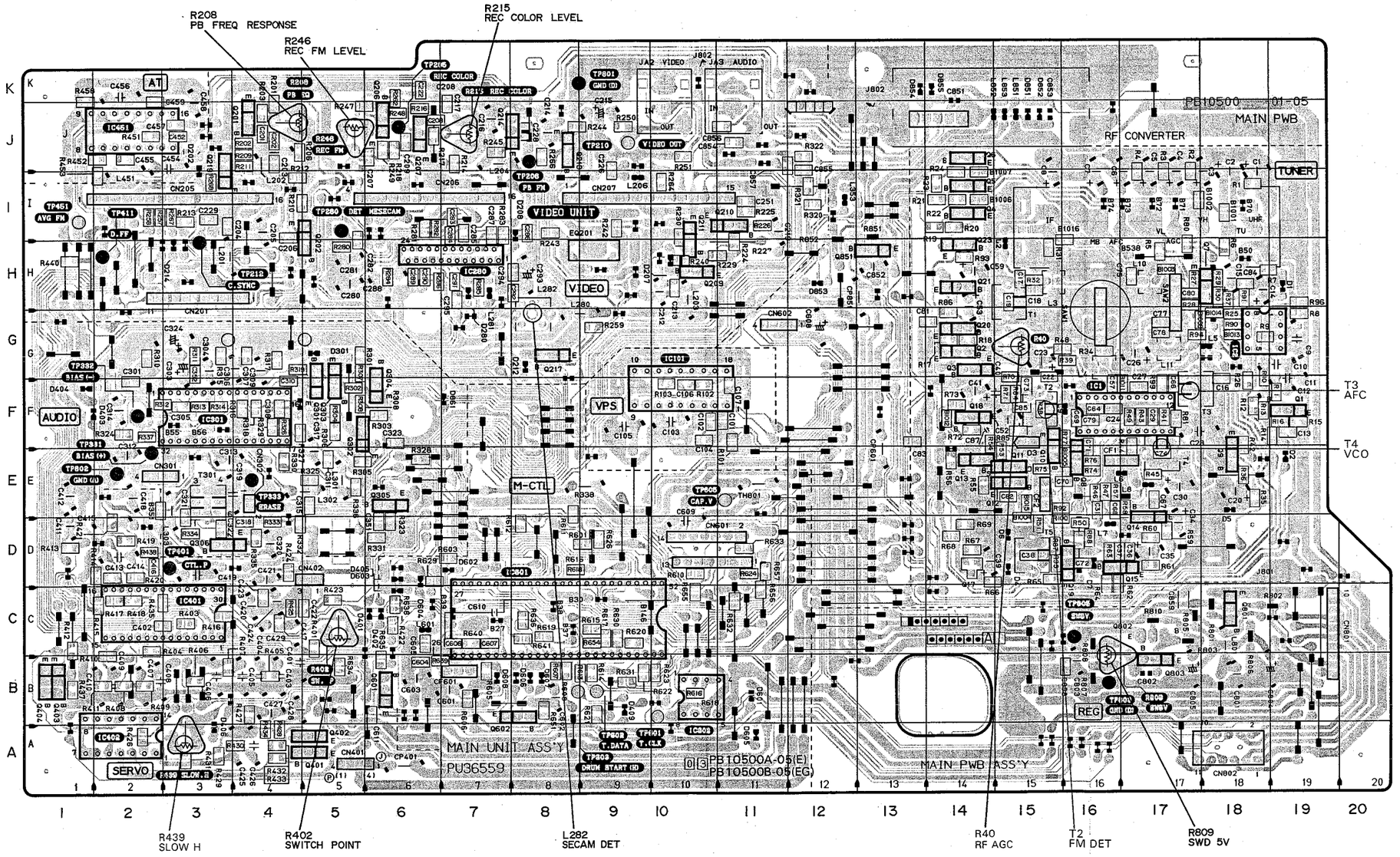
—LOADING MDA—



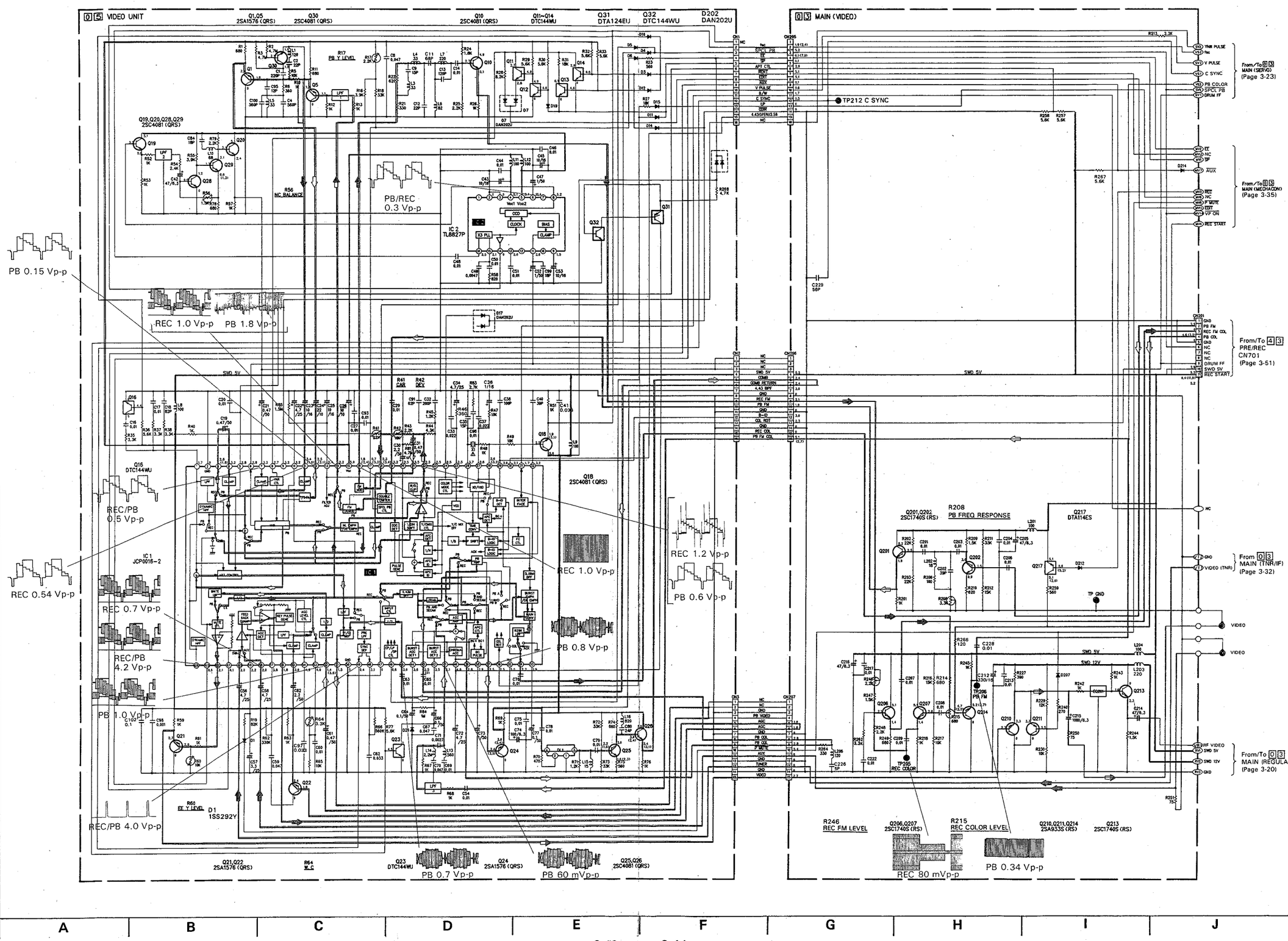
—CASSETTE HOUSING—



3.22 MAIN (AUDIO, SERVO, VIDEO, MECHACON, TUNER/IF) CIRCUIT BOARD

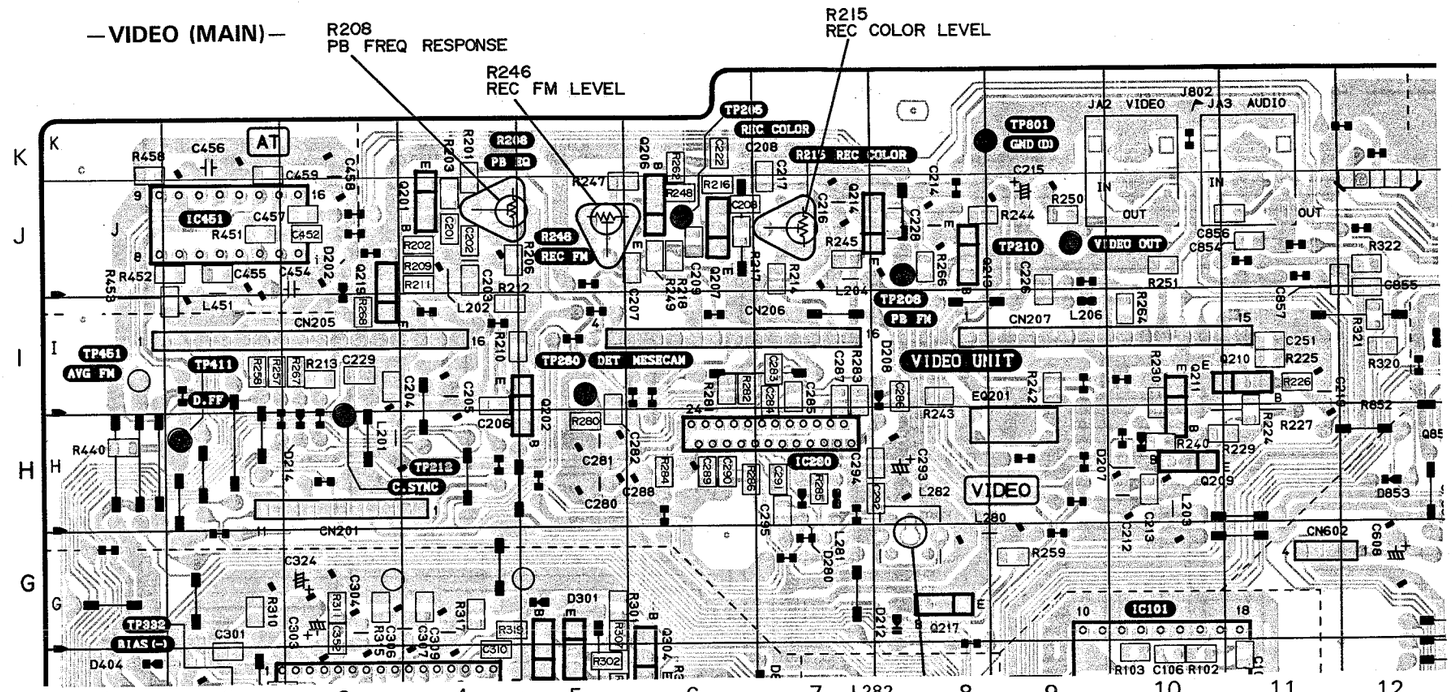


3.23 VIDEO UNIT AND VIDEO SCHEMATIC DIAGRAMS

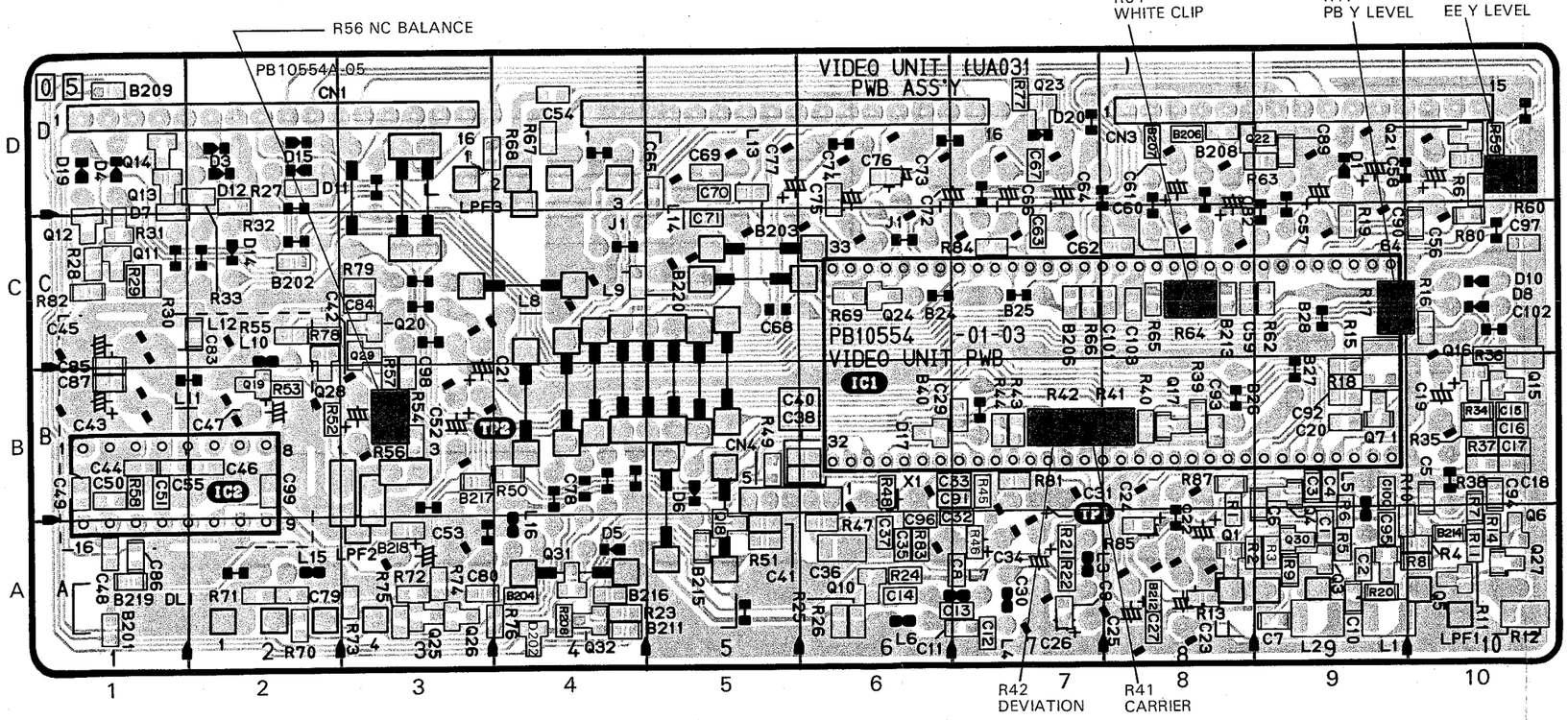


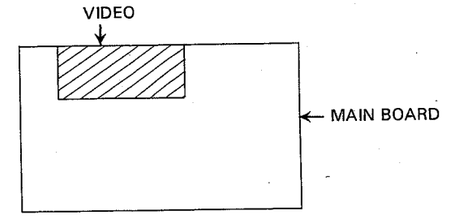
3.24 VIDEO (MAIN) AND VIDEO UNIT CIRCUIT BOARDS

—VIDEO (MAIN)—



—VIDEO UNIT—





• MAIN board assembly is located in page 3-41,42

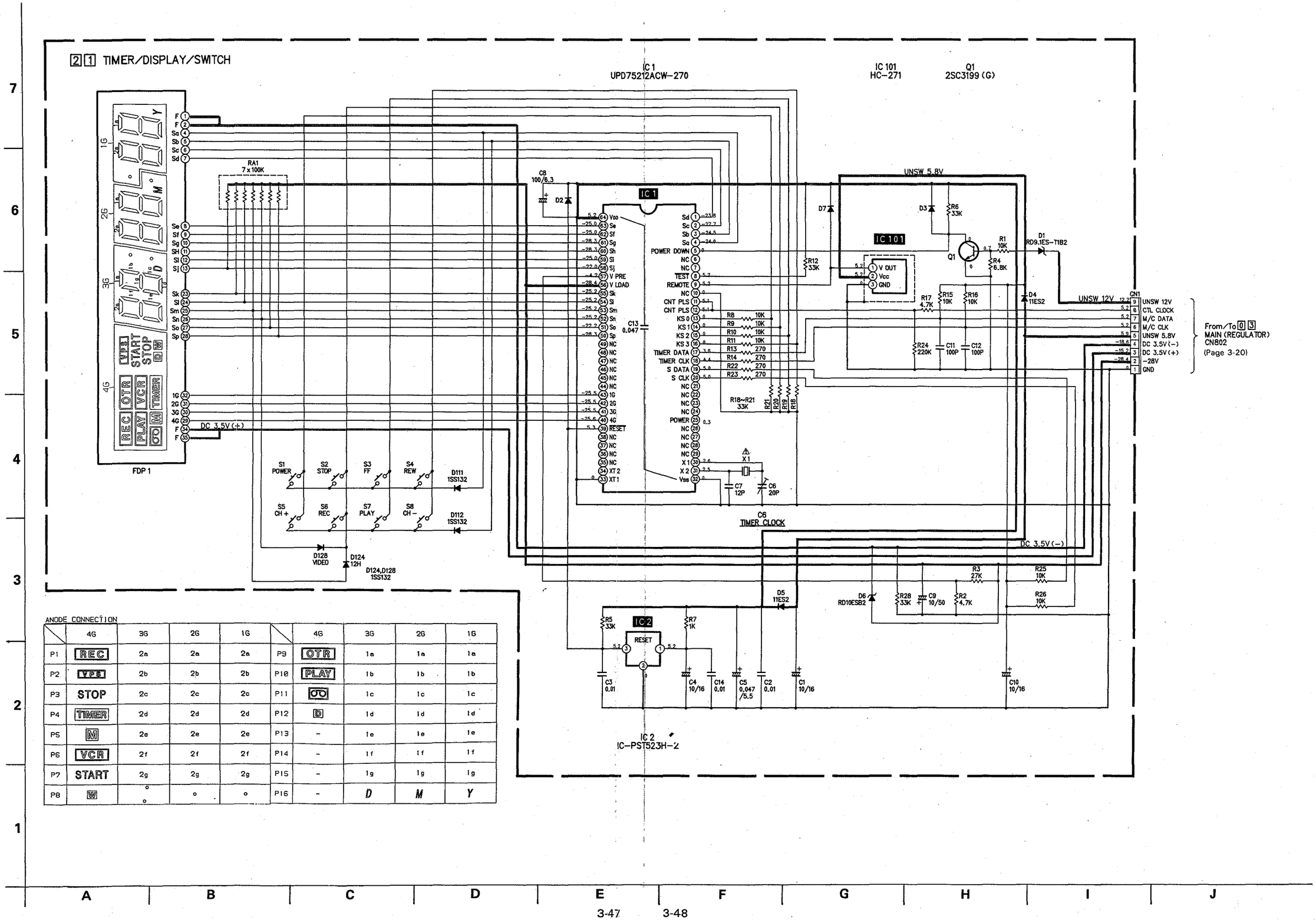
·Only chip parts

REF No.	LOCATION	REF No.	LOCATION	REF No.	LOCATION	REF No.	LOCATION
RESISTOR		RESISTOR		CAPACITOR		CAPACITOR	
R201	K4	R249	J6	C201	J4	C291	H7
R202	J4	R250	J9	C202	J4	C294	H7
R203	J4	R251	J10	C203	J4	C295	H7
R206	J4	R257	I2	C204	I3		
R209	J4	R258	I2	C206	I4		
R210	I4	R259	G9	C207	J6		
R211	J4	R262	K6	C208	J6		
R212	I4	R264	I10	C209	J6		
R213	I3	R266	J8	C213	H10		
R214	J7	R267	I3	C217	K7		
R216	J6	R280	H5	C222	K6		
R217	J6	R281	I6	C226	I9		
R218	J6	R282	I6	C228	J8		
R229	H10	R283	I7	C229	I3		
R230	H10	R284	H6	C251	I11		
R240	H10	R285	H7	C282	H5		
R242	I9	R286	H6	C284	I7		
R243	I8			C285	I7		
R244	J8			C286	I8		
R245	J7			C287	I7		
R247	J5			C289	H6		
R248	J6			C290	H6		

• Only chip parts

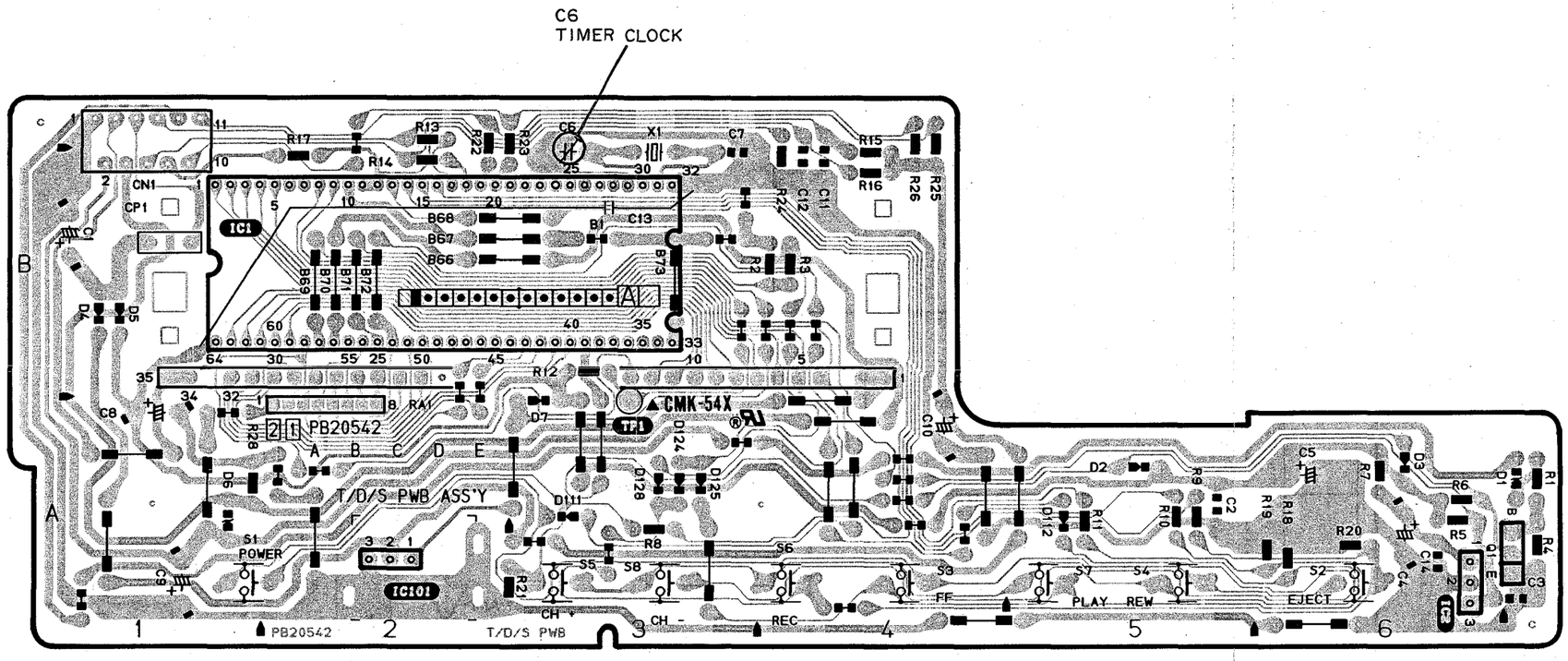
REF No.	LOCATION	REF No.	LOCATION	REF. No.	LOCATION	REF No.	LOCATION
TRANSISTOR		RESISTOR		RESISTOR		CAPACITOR	
Q1	A8	R18	B9	R65	C8	C32	A7
Q5	A10	R19	C9	R66	C7	C33	B6
Q10	A6	R21	A7	R67	D4	C35	A6
Q11	C1	R22	A7	R68	D4	C37	A6
Q12	C1	R23	A4	R69	C6	C38	B6
Q13	D1	R24	A6	R70	A2	C40	B6
Q14	D1	R25	A6	R71	A2	C41	A5
Q16	B10	R26	A6	R72	A3	C44	B1
Q18	A5	R27	D2	R73	A3	C46	B2
Q19	B2	R28	C1	R74	A3	C48	A1
Q20	C3	R29	C1	R75	A3	C49	B1
Q21	D10	R30	C1	R76	A4	C50	B1
Q22	D9	R31	C1	R77	D7	C51	B1
Q23	D7	R32	C2	R78	C2	C54	D4
Q24	C6	R33	D2	R79	C3	C59	C8
Q25	A3	R35	B10	R81	B7	C60	C8
Q26	A3	R36	B10	R83	A6	C62	C8
Q28	B2	R37	B10	R84	C7	C63	C7
Q29	C3	R38	B10	R85	A8	C65	D5
Q30	A9	R40	B8	R208	A4	C67	D7
		R43	B7			C69	D5
		R44	B7	CAPACITOR		C70	D5
		R45	B7			C71	C5
DIODE		R46	A7	C1	A9	C75	D6
D7	C1	R47	A6	C2	A9	C76	D6
D202	A4	R48	B6	C4	B9	C79	A2
		R49	B5	C8	A7	C80	A3
RESISTOR		R51	A5	C9	A7	C84	C3
R1	B8	R52	B2	C11	A7	C91	B7
R2	A9	R53	B2	C12	A7	C93	B8
R3	A9	R54	B3	C13	A6	C95	A9
R5	A9	R55	C2	C14	B10	C96	A6
R6	B9	R57	B3	C16	B10	C97	C10
R10	A9	R58	B1	C17	B10	C98	B3
R11	A10	R59	D10	C18	B10	C99	B2
R12	A10	R61	D10	C20	B9	C100	B9
R13	A8	R62	C9	C27	A8		
R16	C10	R63	D9	C29	B7		

3.25 TIMER/DISPLAY/SWITCH SCHEMATIC DIAGRAM

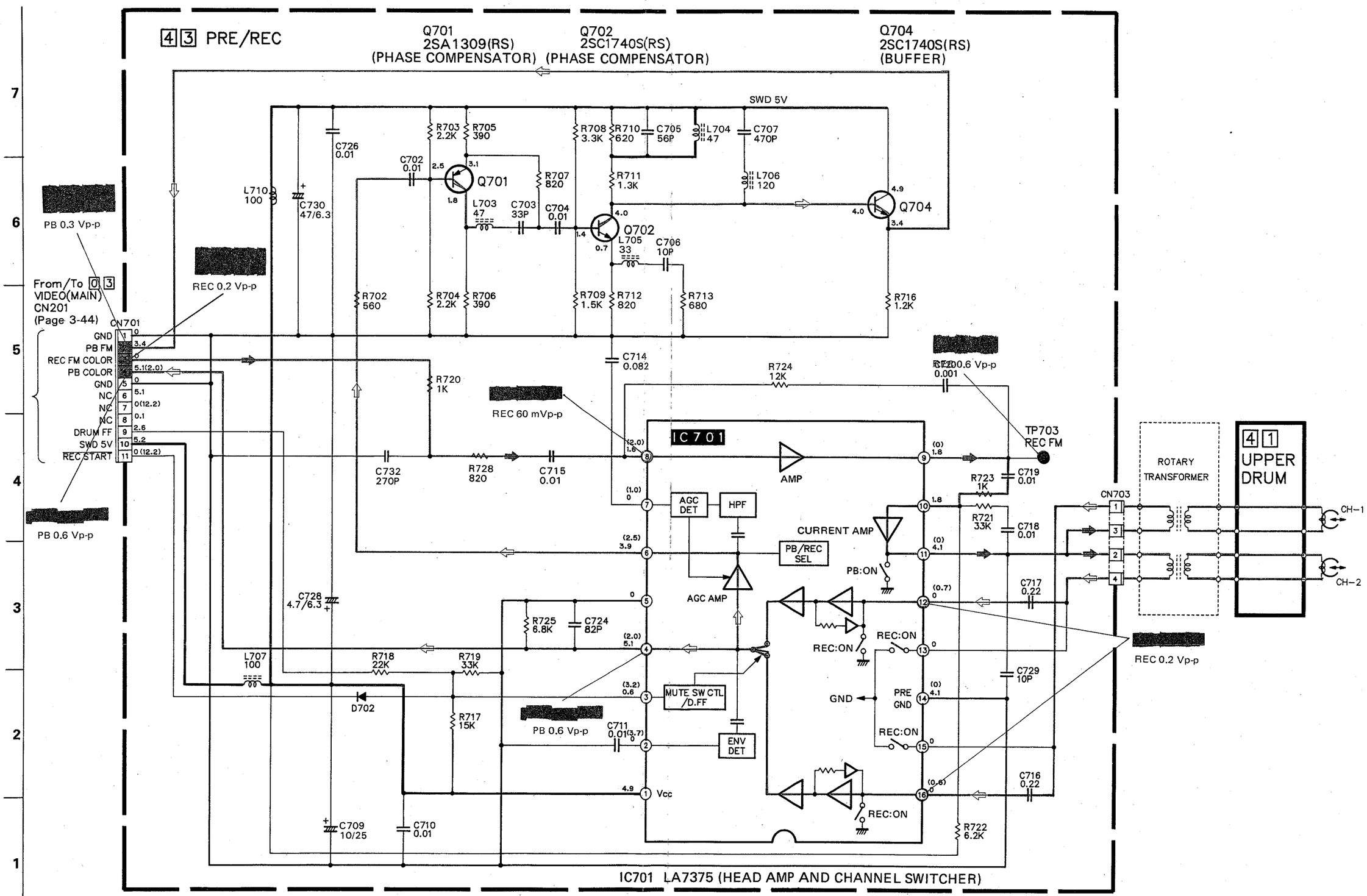


	4G	3G	2G	1G		4G	3G	2G	1G
P1	REC	2a	2a	2a	P9	OTR	1a	1a	1a
P2	VPS	2b	2b	2b	P10	PLAY	1b	1b	1b
P3	STOP	2c	2c	2c	P11	∞	1c	1c	1c
P4	TIMER	2d	2d	2d	P12	D	1d	1d	1d
P5	M	2e	2e	2e	P13	-	1e	1e	1e
P6	VCR	2f	2f	2f	P14	-	1f	1f	1f
P7	START	2g	2g	2g	P15	-	1g	1g	1g
P8	W	° °	°	°	P16	-	D	M	Y

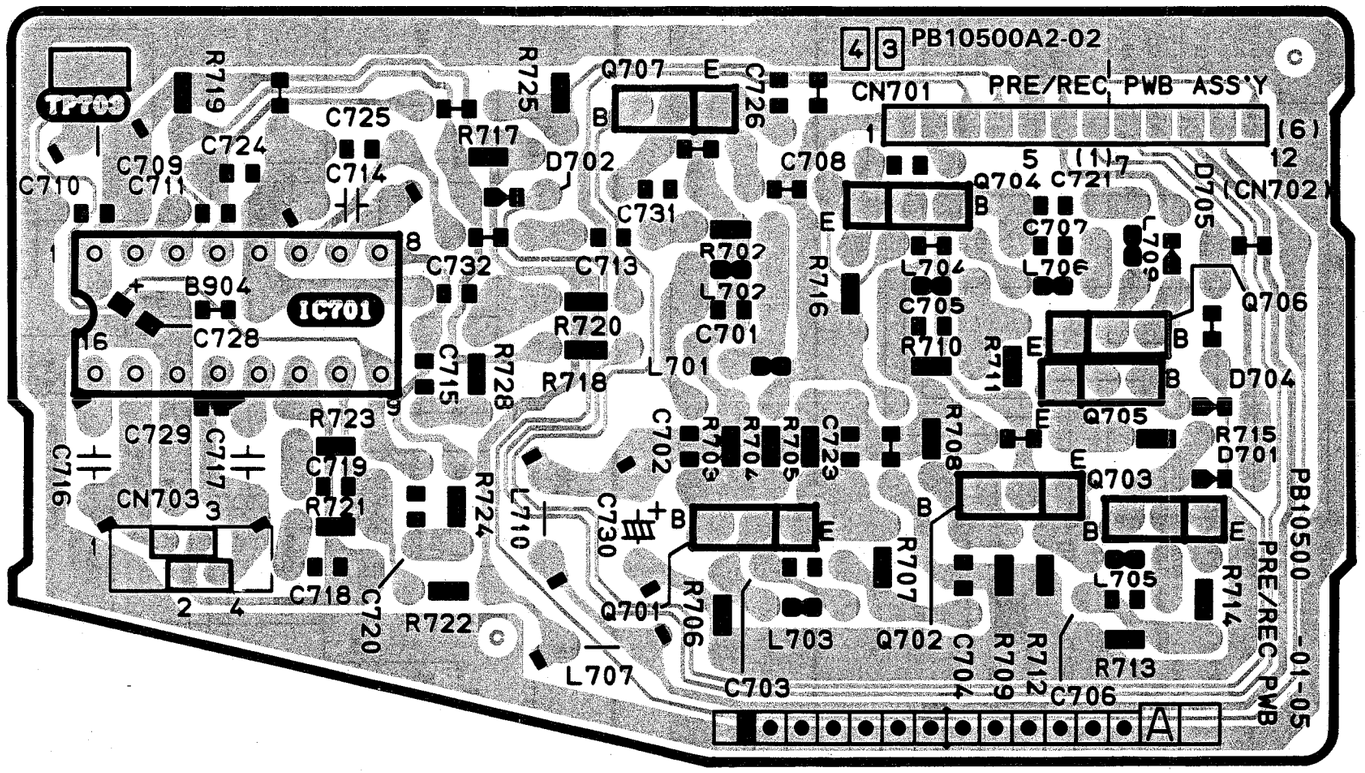
3.26 TIMER/DISPLAY/SWITCH CIRCUIT BOARD



3.27 PRE/REC SCHEMATIC DIAGRAM

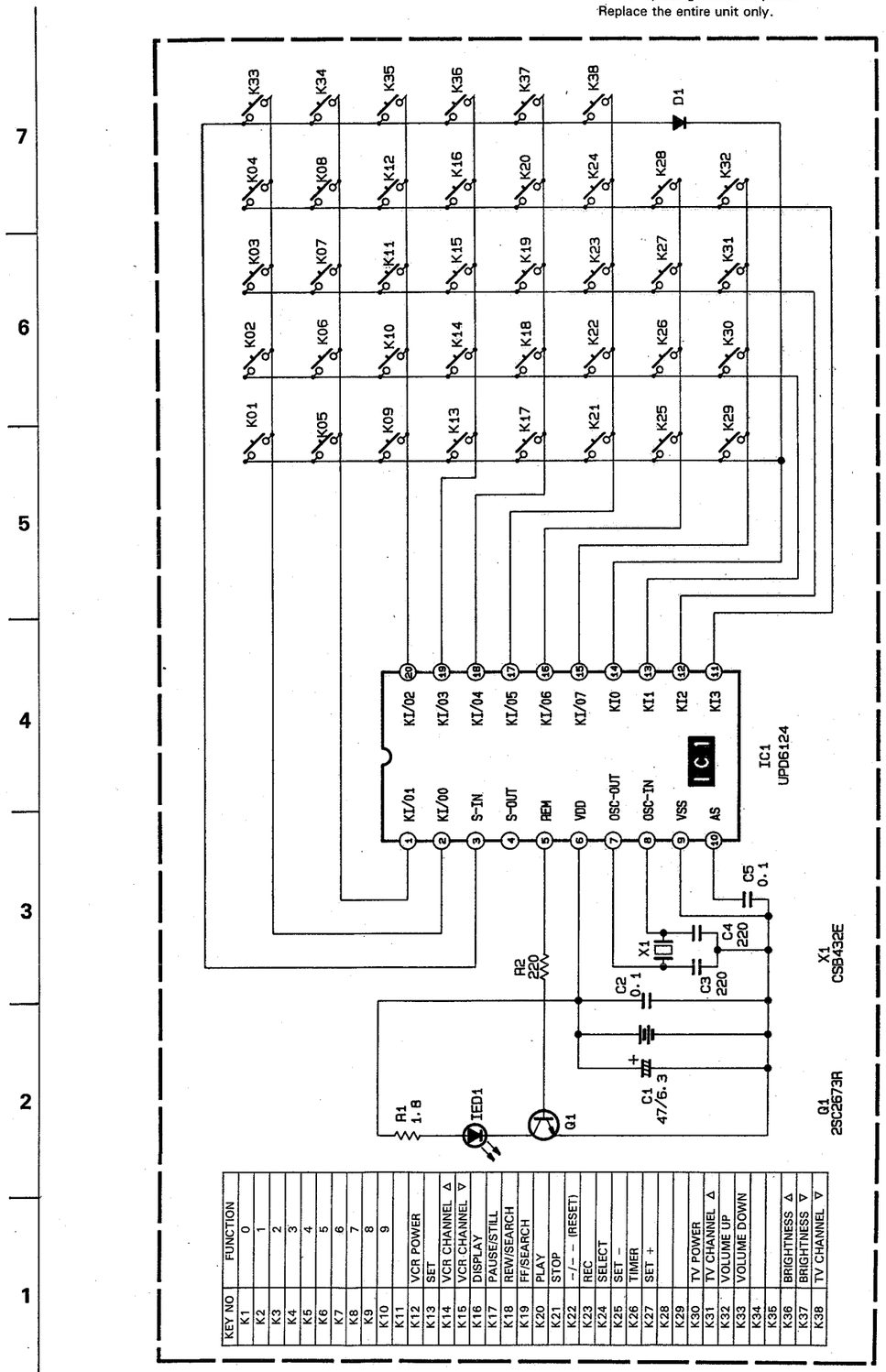


3.28 PRE/REC CIRCUIT BOARD



3.29 REMOTE CONTROL SCHEMATIC DIAGRAM

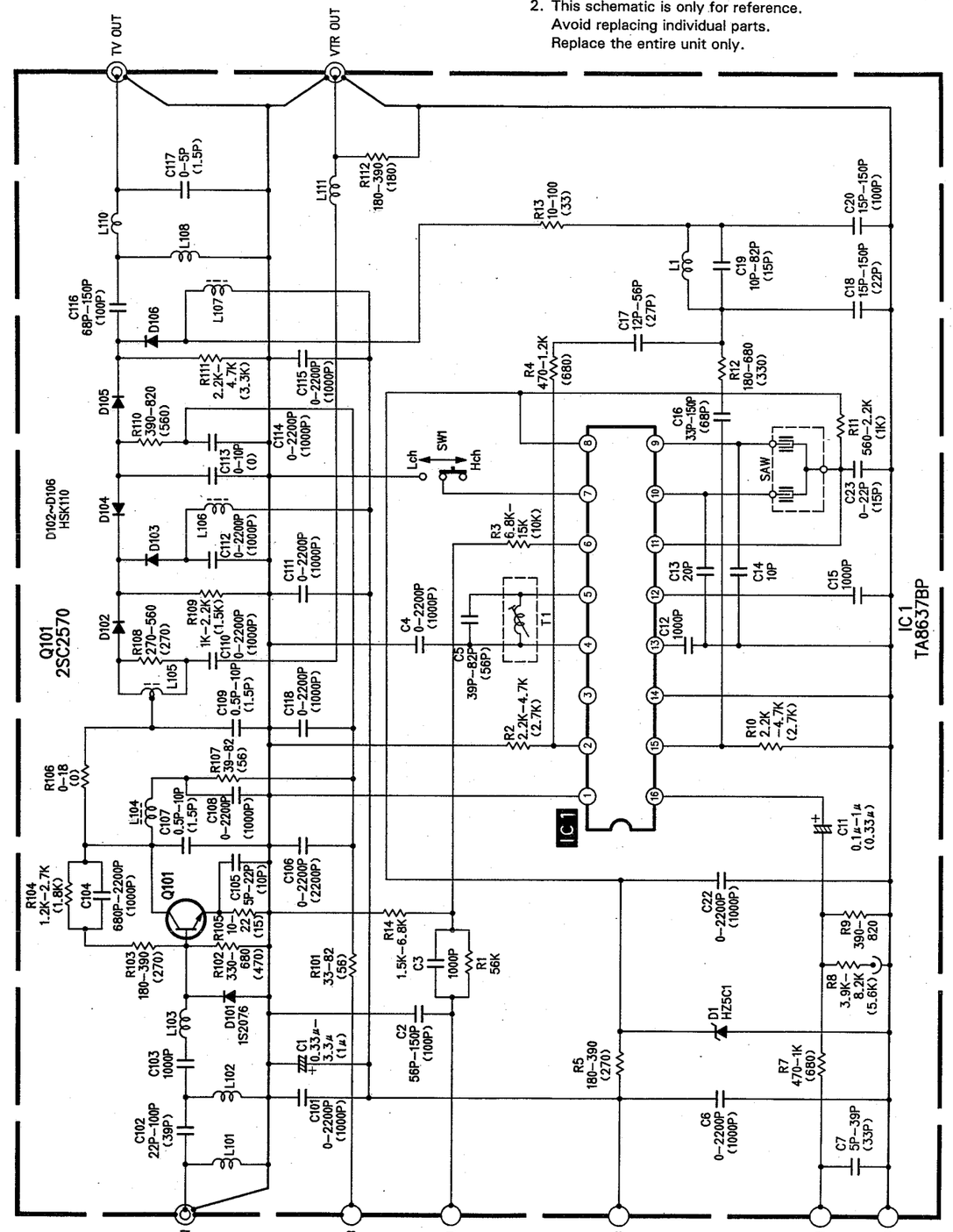
Note:
1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
   Avoid replacing individual parts.
   Replace the entire unit only.



KEY NO	FUNCTION
K1	0
K2	1
K3	2
K4	3
K5	4
K6	5
K7	6
K8	7
K9	8
K10	9
K11	
K12	VCR POWER
K13	SET
K14	VCR CHANNEL △
K15	VCR CHANNEL ▽
K16	DISPLAY
K17	PAUSE/STILL
K18	REW/SEARCH
K19	FF/SEARCH
K20	PLAY
K21	STOP
K22	-/-- (RESET)
K23	REC
K24	SELECT
K25	SET -
K26	TIMER
K27	SET +
K28	
K29	
K30	TV POWER
K31	TV CHANNEL △
K32	VOLUME UP
K33	VOLUME DOWN
K34	
K36	
K36	BRIGHTNESS △
K37	BRIGHTNESS ▽
K38	TV CHANNEL ▽

3.30 RF CONVERTER SCHEMATIC DIAGRAM

Note:
1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
   Avoid replacing individual parts.
   Replace the entire unit only.

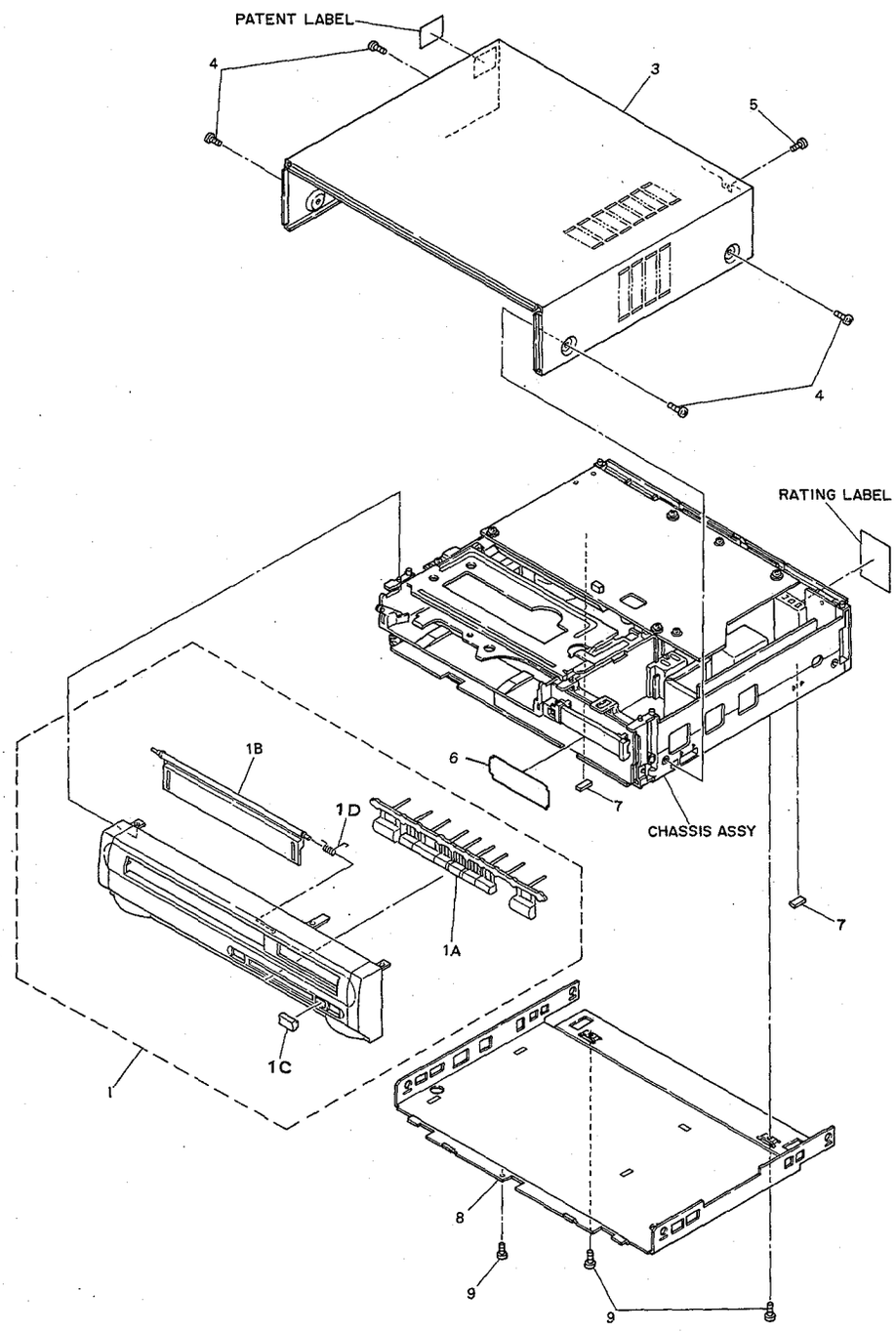


SECTION 4
EXPLODED VIEWS AND PARTS LIST

4.1 MISCELLANEOUS

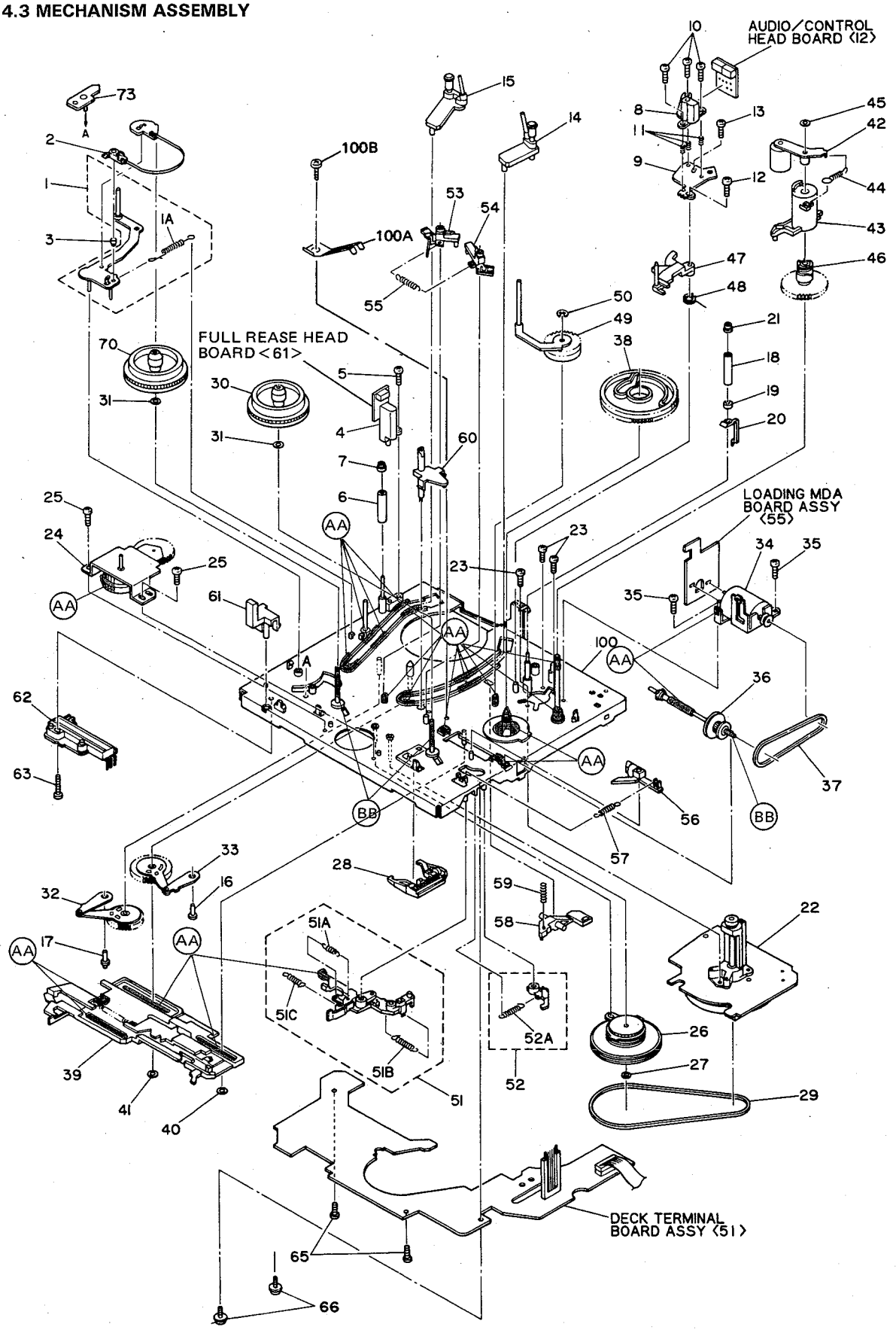
Miscellaneous						
6	4822 321 23308	rf cable		9	4822 736 52534	instructions
7	4822 138 10117	battery		14	4822 218 30606	remote control

4.2 CABINET ASSEMBLY



Cabinet assembly						
1	4822 443 41036	front panel assy		4	4822 502 13813	special screw
1a	4822 410 61453	button(op.)		5	4822 502 13815	special screw
1b	4822 443 63388	cassette door		6	4822 443 63391	filter(fdp)
1c	4822 242 80333	ir window		7	4822 466 40627	foot
1d	4822 492 42565	torsion spring		8	4822 443 51213	bottom cover
3	4822 443 30803	top cover		9	4822 502 13817	screw,for bottom

4.3 MECHANISM ASSEMBLY



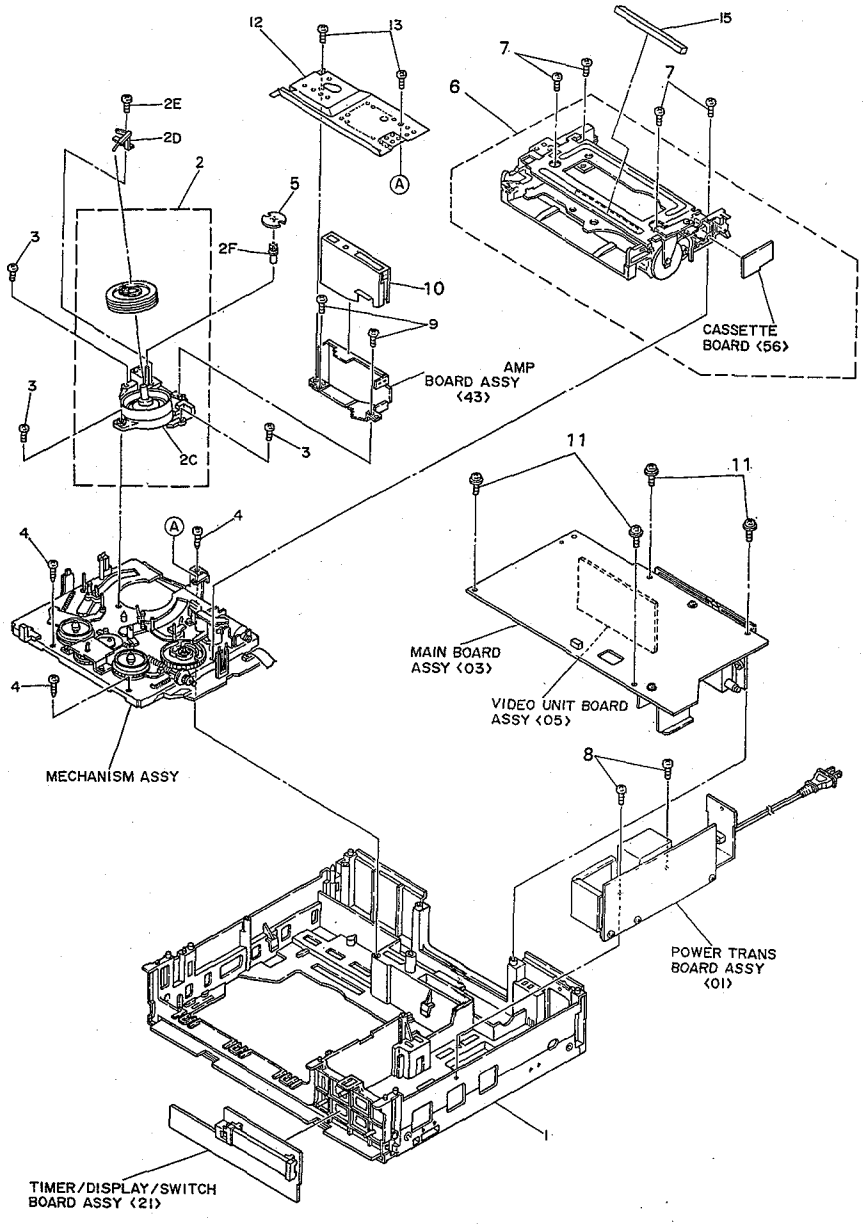
Category	Part number	MARK
Grease	4822 389 10001	(AA)
Oil	5322 390 10096	(BB)

NOTE: The section marked in (AA) and (BB) indicate lubrication and greasing areas.

Mechanism assembly

1	4822 403 70442	tension arm assy
1a	4822 492 33295	tension spring
2	4822 401 11421	tension band assy
3	4822 535 93247	adjust pin
4	4822 249 40281	full erase head
5	4822 502 13816	screw
6	4822 528 90823	roller
7	4822 462 71778	guide pole
8	4822 249 10444	audio/control head
9	4822 464 50858	head base
10	4822 502 13812	special screw
11	4822 492 52267	compression spring
12	4822 502 30531	screw
13	4822 502 13277	screw
14	4822 464 50861	pole base assy (t.u)
15	4822 464 50862	pole base assy (supp)
16	4822 462 41851	stopper
17	4822 462 41852	stopper 2
18	4822 528 90824	tape guide
19	4822 528 90825	guide flange
20	4822 528 90826	tape guard
21	4822 462 71778	guide pole
22	4822 361 60503	capstan motor
23	4822 502 12949	screw
24	4822 522 33112	idler gear unit
25	4822 502 30471	screw
26	4822 522 33113	clutch unit
27	4822 532 12105	slit washer
28	4822 403 70443	change lever assy
29	4822 358 31143	belt
30	4822 528 81451	reel disk (t.u)
31	4822 532 52355	spacer
32	4822 403 70444	loading arm assy (supp)
33	4822 403 70445	loading arm assy (t.u.)
34	4822 361 21462	mode motor assembly
35	4822 502 30471	screw
36	4822 522 10449	worm clutch assy
37	4822 358 31142	belt
38	4822 522 33108	control cam
39	4822 403 70446	plate assy
40	4822 532 12103	slit washer
41	4822 532 12105	slit washer
42	4822 403 70447	pinch roller arm assy
43	4822 403 70441	pinch roller press
44	4822 492 33287	tension spring
45	4822 532 12103	slit washer
46	4822 522 33109	pinch roller cam
47	4822 403 70448	guide arm assy
48	4822 492 42564	torsion spring
49	4822 522 33111	half loading gear assy
50	4822 532 12104	slit washer
51	4822 403 70449	cancel lever assy
51a	4822 492 33293	tension spring
51b	4822 492 33289	tension spring
51c	4822 492 33294	tension spring
52	4822 403 70451	hook assy
52a	4822 492 33291	tension spring
53	4822 403 70452	main brake assy(supp)
54	4822 403 70453	main brake assy(t.u)
55	4822 492 33292	tension spring
56	4822 403 70454	sub brake assy (t.u)
57	4822 492 33288	tension spring
60	4822 255 41225	led holder(incl.Led)
61	4822 276 13134	rec safety switch
62	4822 277 21547	slide switch(s3)
63	4822 502 13816	screw
65	4822 502 13819	screw
66	4822 502 13809	screw
70	4822 528 81452	reel disk (supply)
73	4822 403 70455	tension band bracket
100	4822 464 50857	main deck assy
100a	4822 492 70943	earth plate
100b	4822 502 13828	screw

4.4 CHASSIS ASSEMBLY



Chassis assembly		
1	4822 464 50856	bottom chassis
2	4822 691 20689	drum assy
2c	4822 691 20688	drum base assy
2d	4822 290 81443	brush assy
2e	4822 502 13821	screw
2f	4822 528 90822	roller assy
3	4822 503 21013	screw,for drum
4	4822 502 13814	special screw
5	4822 528 90827	inertia plate
6	4822 464 50859	cassette housing assy
7	4822 502 13818	screw,cass.hous.
8	4822 502 13814	special screw
9	4822 503 21007	screw
10	4822 443 63389	shield cover
11	4822 502 13811	screw
12	4822 443 30804	shield plate
13	4822 502 13818	screw
15	4822 535 93246	spacer

SECTION 5
ELECTRICAL PARTS LIST

PARTSLIST OF VR3241/75

Switching regulator board assy

pwba	4822 214 33373	switching regulator
Transistor		
Q1	4822 130 62795	2SC4517A-LF619
Q2	4822 130 62794	2SC3616(MLK)
Q5	4822 130 60161	2SA933S(S)
Q6	4822 130 42483	2SC1740S(S)
Diode		
D1	4822 130 82698	10E6-F2
D2	4822 130 8269810	E6-F2
D3	4822 130 8269810	E6-F2
D4	4822 130 8269810	E6-F2
D5	4822 130 82686	AU01
D6	4822 130 82686	AU01
D7	4822 130 82687	AU01Z
D8	4822 130 82691	MTZ27BT-77
D21	4822 130 82687	AU01Z
D22	4822 130 82696	RL2Z-LFB2
D23	4822 130 82695	RK14LF-B2
D24	4822 130 82687	AU01Z
D25	4822 130 82687	AU01Z
D27	4822 130 82693	RD30ES-T1B1
D28	4822 130 82694	RD6.2ES-T1B1
D29	4822 130 82692	MTZ33A-77
D30	4822 130 81748	11ES2
Resistor		
R2	4822 111 92039	W.W,2R2
R3	4822 116 83333	330k,1/6W
R4	4822 050 11004	100k,1/6W
R5	4822 116 83141	Oxide,68k,2W
R6	4822 116 83139	Oxide,330k,2W
R7	4822 116 83201	Metal,R47,1W
R8	4822 116 81543	820R,1/6W
R9	4822 050 11202	1k2,1/6W
R17	4822 116 83334	360k,1/6W
R21	4822 116 81729	470R,1/6W
R22	4822 116 81729	470R,1/6W
R23	4822 116 82086	680R,1/6W
R24	4822 116 83199	Metal,475R,1/4W
R24	4822 116 83198	Metal,432R,1/4W
R26	4822 116 81641	4k7,1/6W
R27	4822 116 83202	100R,fusible
R28	4822 116 83204	470R,fusible
C1	4822 121 33979	MM,33nF
C3	4822 121 33979	MM,33nF
C4	4822 126 11617	2.2nF
C5	4822 126 11617	2.2nF
C8	4822 126 11616	2.2nF
C9	4822 126 11616	2.2nF
C10	4822 126 11616	2.2nF
C11	4822 126 11616	2.2nF
C14	4822 124 23819	elco,68μF
C15	4822 124 23161	elco,2.2μF
C16	4822 126 11615	100pF
C17	4822 121 43973	MM,120nF
C18	4822 126 11599	270pF
C19	4822 121 43959	4.7nF
C22	4822 124 11223	4.7nF
C31	4822 124 23856	elco,22μF
C32	4822 124 23855	elco,10μF
C33	4822 124 23834	elco,680μF
C34	4822 124 23098	elco,470μF
C35	4822 124 23872	elco,680μF
C36	4822 124 23844	elco,470μF
C37	4822 124 23853	elco,22μF
C38	4822 124 23857	elco,10μF
C39	4822 124 23871	elco,120μF
C40	4822 124 23156	elco,47μF
C41	4822 121 43958	10nF
C42	4822 121 43981	100nF
C43	4822 121 43958	10nF
Coil		
L1	4822 157 63407	33μH
L2	4822 157 63407	33μH
L3	4822 157 63559	3.3μH
PC1	4822 130 80603	photo coupler
POC1	4822 321 10761	power cord
T1	4822 148 81186	sw trans
Cl1	4822 492 42137	fuse clip
Hd1	4822 401 11312	strain relief
Lf1	4822 121 20261	line filter
Scw1	4822 502 13826	screw
Scw2	4822 502 13826	screw
Scw3	4822 502 13825	screw
Sld1	4822 466 62065	shield case(1)
Sld2	4822 466 62066	shield case(2)
Cn1	4822 265 41134	connector
Cp1	4822 209 63611	circuit protector
Cp2	5322 157 53342	circuit protector
Cp3	4822 209 30296	circuit protector
F1	4822 070 32002	fuse

Main board assy

Pwba	4822 214 33372	main board assy
RF1	4822 214 33374	rf converter
Eth1	4822 403 70459	earth plate
Ja2	4822 264 30321	pin jack,v in/out
Ja3	4822 264 30319	pin jack,a in/out
Scw1	4822 502 13827	screw,for rf conver
Scw2	4822 502 13811	screw
Spc1	4822 462 41855	spacer
Spc2	4822 462 41854	spacer
Tb1	4822 214 33375	terminal board

Tuner/IF section

Tnr1	4822 210 10438	tuner
Integrated circuit		
IC1	4822 209 30247	LA7577V
IC2	4822 209 30246	AN1358
Transistor		
Q1	4822 130 42483	2SC1740S(S)
Q2	4822 130 62589	2SB810H,J
Q3	4822 130 42594	DTC144ES
Q4	4822 130 60161	2SA933S(S)
Q5	4822 130 60161	2SA933S(S)
Q6	4822 130 60161	2SA933S(S)
Q7	4822 130 61187	DTA144TS
Q9	4822 130 41651	2SC2001(LK)
Q10	4822 130 42594	DTC144ES
Q11	4822 130 62796	2SK381(C)
Q12	4822 130 42594	DTC144ES
Q13	4822 130 42483	2SC1740(S)
Q15	4822 130 42483	2SC1740S(S)
Q18	4822 130 61544	2SD1450S,T
Q19	4822 130 60161	2SA933S(S)
Q23	4822 130 62793	2SC3068
Diode		
D1	4822 130 82037	HZT33-02
D2	4822 130 82688	E-103
D5	4822 130 82689	MTZ11B
Resistor		
R3	4822 116 83193	68k,1/10W

R5	4822 116 83165	220k,1/10W
R7	4822 116 83145	1k,1/10W
R8	4822 116 83164	22k,1/10W
R9	4822 116 83157	150k,1/10W
R10	4822 116 83157	150k,1/10W
R11	4822 116 83142	0R0,1/10W
R12	4822 116 83142	0R0,1/10W
R24	4822 116 83174	330R,1/10W
R14	4822 116 83176	33k,1/10W
R15	4822 116 83146	10k,1/10W
R16	4822 116 83146	10k,1/10W
R17	4822 116 83156	15k,1/10W
R18	4822 116 83159	1k8,1/10W
R19	4822 116 83159	1k8,1/10W
R20	4822 116 83156	15k,1/10W
R21	4822 116 83159	1k8,1/10W
R22	4822 116 83156	15k,1/10W
R23	4822 116 83159	1k8,1/10W
R24	4822 116 83156	15k,1/10W
R25	4822 116 83183	47k,1/10W
R26	4822 116 83142	0R0,1/10W
R27	4822 116 83165	220k,1/10W
R28	4822 116 83188	560k,1/10W
R29	4822 116 83168	2k7,1/10W
R30	4822 116 83163	2k2,1/10W
R32	4822 116 83194	75R,1/10W
R35	4822 116 83174	330R,1/10W
R36	4822 116 83144	100R,1/10W
R37	4822 116 83142	0R0,1/10W
R38	4822 116 83155	1k5,1/10W
R39	4822 116 83159	1k8,1/10W
R40	4822 100 11785	potm.6k8,rf agc
R41	4822 116 83177	330k,1/10W
R42	4822 116 83177	330k,1/10W
R43	4822 116 83145	1k,1/10W
R44	4822 116 83158	160R,1/10W
R45	4822 116 83154	150R,1/10W
R46	4822 116 83191	680R,1/10W
R47	4822 116 83145	1k,1/10W
R48	4822 116 83196	8k2,1/10W
R50	4822 116 83178	390R,1/10W
R51	4822 116 83163	2k2,1/10W
R53	4822 116 83148	1M,1/10W
R54	4822 116 83193	68k,1/10W
R55	4822 116 83169	27k,1/10W
R56	4822 116 83195	820R,1/10W
R60	4822 116 83181	470R,1/10W
R61	4822 116 83162	180k,1/10W
R62	4822 116 83196	8k2,1/10W
R63	4822 116 83164	22k,1/10W
R64	4822 116 83196	8k2,1/10W
R65	4822 116 83175	3k3,1/10W
R70	4822 116 83175	3k3,1/10W
R71	4822 116 83159	1k8,1/10W
R72	4822 116 83146	10k,1/10W
R73	4822 116 83163	2k2,1/10W
R80	4822 116 83161	18k,1/10W
R81	4822 116 83197	820k,1/10W
R87	4822 116 83335	3k9,1/10W
R88	4822 116 83196	8k2,1/10W
R90	4822 116 83142	0R0,1/10W
R91	4822 116 83183	47k,1/10W
R93	4822 116 83174	330R,1/10W
R96	4822 116 83164	22k,1/10W
R99	4822 116 83175	3k3,1/10W
Capacitor		
C2	4822 124 23864	elco,10μF
C4	4822 124 23866	2.2μF
C6	4822 124 23866	2,2μF
C8	4822 124 23873	elco,10μF
C9	4822 121 43963	15nF
C10	4822 121 43966	33nF
C13	4822 126 11611	10nF
C14	4822 124 23864	elco,10μF
C15	4822 124 23865	elco,0.22μF
C20	4822 124 23874	elco,47μF
C22	4822 126 11611	10nF
C23	4822 124 23869	elco,0.47μF
C24	4822 126 10489	47nF
C26	4822 124 23873	elco,10μF
C27	4822 126 11611	10nF
C28	4822 121 43971	68nF
C29	4822 126 11612	1nF
C30	4822 124 23869	elco,0.47μF
C31	4822 126 11606	18pF
C35	4822 124 42277	elco,0.1μF
C40	4822 121 43969	47nF
C41	4822 124 23863	elco,1μF
C57	4822 126 11613	2.2nF
C59	4822 124 23861	elco,33μF
C64	4822 126 11614	330pF
C66	4822 126 11605	120pF
C67	4822 126 11834	110pF
C68	4822 116 83142	0R0,1/10W
C69	4822 126 11608	180pF
C70	4822 116 83142	0R0,1/10W
C71	4822 116 83142	0R0,1/10W
C72	4822 126 11837	82pF
C73	4822 126 11612	1nF
C75	4822 126 11838	150pF
C77	4822 116 83142	0R0
C78	4822 126 11611	10nF
C79	4822 126 11611	10nF
C87	4822 124 42247	elco,100μF
C92	4822 126 11836	56pF
Coil		
L3	4822 157 63403	1μH
L4	4822 157 63404	1.5μH
L5	4822 157 63401	6.8μH
L6	4822 157 63402	8.2μH
L7	4822 157 62378	47μH
L8	4822 157 63402	8.2μH
L9	4822 157 62377	22μH
L12	4822 157 90197	100uH
Cf1	4822 242 80335	cer.filter
Cf2	4822 242 80337	cer.filter
Saw1	4822 242 80336	saw.filter
T2	4822 157 63391	coil
T3	4822 157 63395	coil
T4	4822 157 63394	coil
Video section		
Transistor		
Q201	4822 130 42483	2SC1740S(RS)
Q202	4822 130 42483	2SC1740S(RS)
Q206	4822 130 42483	2SC1740S(RS)
Q207	4822 130 42483	2SC1740S(RS)
Q210	4822 130 60161	2SA933S(RS)
Q211	4822 130 60161	2SA933S(RS)
Q213	4822 130 42483	2SC1740S(RS)
Q214	4822 130 60161	2SA933S(RS)
Q217	4822 130 60591	DAT114ES
Diode		
D207	4822 130 32778	1SS133
D212	4822 130 32778	1SS133
D214	4822 130 32778	1SS133
Resistor		
R201	4822 116 83145	1k,1/10W
R202	4822 116 83164	22k,1/10W
R203	4822 116 83164	22k,1/10W
R206	4822 116 83144	100R,1/10W
R208	4822 100 11782	potm.3k3,pb freq.
R209	4822 116 83155	1k5,1/10W
R210	4822 116 83189	620R,1/10W

R211	4822 116 83176	33k,1/10W
R212	4822 116 83156	15k,1/10W
R213	4822 116 83163	2k2,1/10W
R214	4822 116 83191	680R,1/10W
R215	4822 100 11784	potm.680R,rec col.
R216	4822 116 83156	15k,1/10W
R217	4822 116 83146	10k,1/10W
R218	4822 116 83145	1k,1/10W
R227	4822 050 13901	390R,1/2W
R229	4822 116 83151	12k,1/10W
R230	4822 116 83146	10k,1/10W
R240	4822 116 83167	270R,1/10W
R242	4822 116 83145	1k,1/10W
R243	4822 116 83145	1k,1/10W
R244	4822 116 83155	1k5,1/10W
R245	4822 116 83145	1k,1/10W
R246	4822 100 11781	potm.2k2,rec fm
R247	4822 116 83155	1k5,1/10W
R248	4822 116 83163	2k2,1/10W
R249	4822 116 83191	680R,1/10W
R250	4822 116 83194	75R,1/10W
R241	4822 116 83194	75R,1/10W
R257	4822 116 83186	5k6,1/10W
R258	4822 116 83186	5k6,1/10W
R259	4822 116 83185	560R,1/10W
R262	4822 116 83175	3k3,1/10W
R264	4822 116 83174	330R,1/10W
R266	4822 116 83149	120R,1/10W
R267	4822 116 83187	5k6,1/10W
Capacitor		
C201	4822 126 11601	10nF
C202	4822 126 11602	39pF
C203	4822 126 11601	10nF
C204	4822 126 11601	10nF
C205	4822 124 23825	elco,47μF
C206	4822 126 11601	10nF
C207	4822 126 11601	10nF
C208	4822 126 11601	10nF
C209	4822 126 11601	10nF
C212	4822 124 42286	elco,470μF
C213	4822 126 11601	10nF
C214	4822 124 23859	elco,47μF
C215	4822 124 23841	elco,1000μF
C216	4822 124 23859	elco,47μF
C217	4822 126 11601	10nF
C222	4822 126 11601	10nF
C226	4822 126 11603	5pf
C228	4822 126 11601	10nF
C229	4822 126 11604	56pF
Coil		
L201	4822 157 60104	100μH
L202	4822 157 62375	18μH
L203	4822 157 63558	220μH
L204	4822 157 60104	100μH
L206	4822 157 62373	120μH
Eq20	4822 218 30609	equalizer
Cn20	4822 265 41142	connector
Audio section		
Integrated circuit		
IC30	4822 209 73482	BA7765AS
Transistor		
Q301	4822 130 42483	2SC1740S(RS)
Q302	4822 130 42483	2SC1740S(RS)
Q303	4822 130 42683	DTC144ES
Q304	4822 130 60161	2SA933S(RS)
Q305	4822 130 42682	DTA144ES
Q306	4822 130 42483	2SC1740S(RS)
Diode		
D301	4822 130 32778	1SS133
Resistor		
R301	4822 116 83156	15k,1/10W
R302	4822 116 83163	2k2,1/10W
R303	4822 116 83183	47k,1/10W
R304	4822 116 83172	3K,1/10W
R305	4822 116 83146	10k,1/10W
R306	4822 116 83168	2k7,1/10W
R307	4822 116 83145	1k,1/10W
R308	4822 116 83163	2k2,1/10W
R310	4822 116 83164	22k,1/10W
R311	4822 116 83167	270R,1/10W
R312	4822 116 83171	270k,1/10W
R313	4822 116 83146	10k,1/10W
R315	4822 116 83146	10k,1/10W
R316	4822 116 83164	22k,1/10W
R317	4822 116 83184	4M7,1/10W
R318	4822 116 83151	12k,1/10W
R319	4822 116 83176	33k,1/10W
R320	4822 116 83195	820R,1/10W
R321	4822 116 83189	620R,1/10W
R322	4822 116 83185	560R,1/10W
R323	4822 116 83164	22k,1/10W
R324	4822 116 83173	30k,1/10W
R325	4822 116 83154	150R,1/10W
R326	4822 116 83168	2k7,1/10W
R327	4822 116 83173	30k,1/10W
R328	4822 116 83164	22k,1/10W
R330	4822 116 83146	10k,1/10W
R331	4822 116 83193	68k,1/10W
R332	4822 116 83186	5k6,1/10W
R333	4822 116 83153	13k,1/10W
R334	4822 116 83176	33k,1/10W
R335	4822 116 83179	4R7,1/10W
R336	4822 116 83149	120R,1/10W
R337	4822 116 83143	10R,1/10W
R338	4822 116 83203	fusible,4R7
Capacitor		
C301	4822 126 11651	1.2nF
C303	4822 124 23822	elco,1μF
C304	4822 124 23826	elco,10μF
C305	4822 126 11649	12nF
C306	4822 124 23832	elco,1μF
C309	4822 124 23827	elco,22μF
C310	4822 126 11633	100nF
C312	4822 124 23828	elco,33μF
C313	4822 124 23831	elco,100μF
C314	4822 124 23832	elco,1μF
C315	4822 126 11649	12nF
C317	4822 124 23833	elco,3.3μF
C318	4822 126 11646	330pF
C319	4822 121 43978	82nF
C320	4822 124 23862	elco4.7μF
C321	4822 126 11654	4.7nF
C322	4822 126 11648	22nF
C323	4822 126 11635	82nF
Coil		
L302	4822 157 63399	12mH
L303	4822 157 63397	470μH
T301	4822 148 81187	osc transformer
Cn301	4822 265 30909	connector
Cn302	4822 265 20527	connector
Servo section		
Integ	rated circuit	
IC401	4822 209 80587	BU2829S
IC402	4822 209 30234	LM324N
IC451	4822 30234	BA7039
Diode		
D401	4822 130 32778	1SS133
D402	4822 130 32778	1SS133
D403	4822 130 32778	1SS133
D404	4822 130 32778	1SS133
D405	4822 130 32778	1SS133
D406	4822 130 80337	MTZ5.1B
D409	4822 130 32778	1SS133
Resistor		

R401	4822 116 83183	47k,1/10W
R402	4822 100 11786	potm.680k,Hsw.Point
R403	4822 116 83145	1k,1/10W
R404	4822 116 83183	47k,1/10W
R405	4822 116 83183	47k,1/10W
R406	4822 116 83183	47k,1/10W
R407	4822 116 83183	47k,1/10W
R408	4822 116 83183	47k,1/10W
R409	4822 116 83183	47k,1/10W
R410	4822 116 83183	47k,1/10W
R411	4822 116 83183	47k,1/10W
R412	4822 116 83148	1M,1/10W
R413	4822 116 83169	27k,1/10W
R414	4822 116 83182	27K,1/10W
R415	4822 116 83182	27K,1/10W
R416	4822 116 83147	100k,1/10W
R417	4822 116 83151	12k,1/10W
R418	4822 116 83166	2M2,1/10W
R419	4822 116 83187	56k,1/10W
R420	4822 116 83164	22k,1/10W
R421	4822 116 83163	2k2,1/10W
R422	4822 116 83145	1k,1/10W
R423	4822 116 83145	1k,1/10W
R424	4822 116 83154	150R,1/10W
R425	4822 116 83146	10k,1/10W
R426	4822 116 83176	33k,1/10W
R429	4822 116 83223	3M3,1/10W
R430	4822 116 83177	330k,1/10W
R431	4822 116 83175	3k3,1/10W
R433	4822 116 83148	1M,1/10W
R434	4822 116 83169	27k,1/10W
R439	4822 101 21168	potm,10k
R440	4822 116 83145	1k,1/10W
R451	4822 116 83145	1k,1/10W
R452	4822 116 83163	2k2,1/10W
R453	4822 116 83168	2k7,1/10W
R458	4822 116 83152	120k,1/10W
Capacitor		
C401	4822 121 43355	6.8nF
C402	4822 126 11612	1nF
C403	4822 121 43352	4.7nF
C404	4822 121 43352	4.7nF
C405	4822 121 43353	47nF
C406	4822 121 43353	47nF
C407	4822 121 43965	2.2nF
C408	4822 121 43965	2.2nF
C409	4822 121 43961	47nF
C410	4822 121 43961	47nF
C411	4822 124 23862	elco,4.7μF
C412	4822 124 23862	elco,4.7μF
C413	4822 126 11652	220pF
C414	4822 121 43964	1.8nF
C415	4822 121 43975	270nF
C416	4822 126 11653	3.3nF
C417	4822 126 11612	1nF
C418	4822 124 23873	elco,10μF
C419	4822 121 43353	47nF
C420	4822 124 23873	elco,10μF
C421	4822 124 23874	elco,47μF
C422	4822 126 11612	1nF
C423	4822 126 11612	1nF
C424	4822 124 23858	elco,22μF
C425	4822 121 43968	82nF
C426	4822 121 43962	820nF
C427	4822 124 23826	elco,10μF
C428	4822 124 23826	elco,10μF
C429	4822 121 43967	56nF
C452	4822 126 11611	10nF
C454	4822 121 43347	100nF
C455	4822 126 11611	10nF
C456	4822 121 43347	100nF
C457	4822 126 11611	10nF
C458	4822 124 23858	elco,22μF
C459	4822 126 11611	10nF
Coil		
L451	4822 157 90157	27μH
Cn401	4822 265 30909	connector
Cn402	4822 265 30911	connector
Cp401	4822 252 20172	circuit protector
Mechacon section		
Integrated circuit		
IC601	4822 209 30242	M37417M-136SP
IC602	4822 209 30236	CAT93C46P
Transistor		
Q601	4822 130 42683	DTC124ES
Q602	4822 130 42683	DTC124ES
Diode		
D601	4822 130 82704	MTZ7.5B
D602	4822 130 32778	1SS133
D603	4822 130 32778	1SS133
D604	4822 130 32778	1SS133
D605	4822 130 32778	1SS133
D606	4822 130 32778	1SS133
D607	4822 130 32778	1SS133
D608	4822 130 32778	1SS133
Resistor		
R601	4822 116 83182	27K,1/10W
R603	4822 116 83145	1k,1/10W
R605	4822 116 83146	10k,1/10W
R606	4822 116 83182	27K,1/10W
R607	4822 116 83181	470R,1/10W
R608	4822 116 83176	33k,1/10W
R610	4822 116 83146	10k,1/10W
R611	4822 116 83145	1k,1/10W
R612	4822 116 83182	4K7,1/10W
R613	4822 116 83145	1k,1/10W
R614	4822 116 83145	1k,1/10W
R615	4822 116 83182	4K7,1/10W
R616	4822 116 83182	4K7,1/10W
R617	4822 116 83182	4K7,1/10W
R618	4822 116 83182	4K7,1/10W
R619	4822 116 83178	390R,1/10W
R620	4822 116 83182	4K7,1/10W
R621	4822 116 83146	10k,1/10W
R622	4822 116 83182	4K7,1/10W
R623	4822 116 83182	4K7,1/10W
R624	4822 116 83157	150k,1/10W
R626	4822 116 83187	56k,1/10W
R629	4822 116 83196	8k2,1/10W
R630	4822 116 83182	4K7,1/10W
R631	4822 116 83182	4K7,1/10W
R632	4822 116 83182	4K7,1/10W
R633	4822 116 83176	33k,1/10W
R634	4822 116 83182	4K7,1/10W
R635	4822 116 83146	10k,1/10W
R636	4822 116 83182	4K7,1/10W
R638	4822 116 83182	4K7,1/10W
R639	4822 116 83191	680R,1/10W
R640	4822 116 83148	1M,1/10W
R641	4822 116 83146	10k,1/10W
R654	4822 116 83182	4K7,1/10W
R655	4822 116 83146	10k,1/10W
R656	4822 116 83146	10k,1/10W
R657	4822 116 83146	10k,1/10W
Capacitor		
C601	4822 124 23832	elco,1μF
C602	4822 124 23824	elco,100μF
C603	4822 124 23829	elco,3.3μF
C604	4822 126 11636	22nF
C605	4822 126 11634	47nF
C607	4822 126 11645	22pF
C608	4822 124 42285	elco100μF
C610	4822 126 11632	100nF
C611	4822 126 11639	120pF

Coil			
L601	4822 157 60104		100μH
Cf60	4822 242 80342		resonator
Th801	4822 111 91712		positive thermistor
Cn601	4822 403 70457		wire trap
Cn602	4822 265 30912		connector
CP601	4822 209 63611		circuit prot.
Regulator section			
Transistor			
Q801	4822 130 62799		2SB1068(KU)
Q802	4822 130 62801		2SD2166(QRS)
Q803	4822 130 42483		2SC1740S
Q851	4822 130 62589		2SB810H,J
Diode			
D853	4822 130 32778		1SS133
D854	4822 130 32778		1SS133
D855	4822 130 32778		1SS133
Resistor			
R801	4822 116 81636		10k,1/6W
R802	4822 116 81542		2k2,1/6W
R803	4822 050 11202		1k2,1/6W
R805	4822 116 81641		4k7,1/6W
R806	4822 116 81729		470R,1/6W
R807	4822 050 11202		1k2,1/6W
R808	4822 116 81695		560R,1/6W
R809	4822 100 11783		potm.470R,swd 5v
R851	4822 050 23903		39k,1/6W
R852	4822 116 81536		1k,1/6W
Capacitor			
C801	4822 124 23859		elco,47μF
C802	4822 126 11647		10nF
C803	4822 124 23859		elco,47μF
C804	4822 124 23838		elco,470μF
C851	4822 126 11689		1nF
C852	4822 124 23874		elco,47μF
C856	4822 126 11841		100nF
Coil			
L801	4822 157 60104		100μH
L851	4822 157 62372		10μH
L852	4822 157 90197		100μH
Cn80	4822 265 41141		connector
Cn80	4822 403 70458		wire trap
Cp85	4822 252 20186		circuit protector
Pre/Rec. amp. board assy			
pwba	4822 214 33381		pre/rec amp board as
pwba	4822 214 33384		extension board assy
Integrated circuit			
IC70	4822 209 30241		LA7375
Transistor			
Q701	4822 130 60088		2SA1309(RS)
Q702	4822 130 42483		2SC1740S(RS)
Q704	4822 130 42483		2SC1740S(RS)
Diode			
D702	4822 130 32778		1SS133
Resistor			
R702	4822 116 81695		560R,1/6W
R703	4822 116 81542		2k2,1/6W
R704	4822 116 81542		2k2,1/6W
R705	4822 116 81639		390R,1/6W
R706	4822 116 81639		390R,1/6W
R707	4822 116 81543		820R,1/6W
R708	4822 116 81727		3k3,1/6W
R709	4822 116 81537		1k5,1/6W
R710	4822 110 30962		620R,1/6W
R711	4822 111 30961		1k3,1/6W
R712	4822 116 81543		820R,1/6W
R713	4822 116 82086		680R,1/6W
R716	4822 050 11202		1k2,1/6W
R717	4822 116 81538		15k,1/6W
R718	4822 116 81637		22k,1/6W
R719	4822 116 81638		33k,1/6W
R720	4822 11130964		1k,1/6W
R721	4822 116 81638		33k,1/6W
R722	4822 111 30963		6k2,1/6W
R723	4822 116 81536		1k,1/6W
R724	4822 050 11203		12k,1/6W
R725	4822 050 16802		6k8,1/6W
R728	4822 116 81543		820R,1/6W
Capacitor			
C702	4822 126 11647		10nF
C703	4822 126 11643		33pF
C704	4822 126 11647		10nF
C705	4822 126 11644		56pF
C706	4822 126 11641		10pF
C707	4822 126 10425		470pF
C709	4822 124 23821		elco10μF
C710	4822 126 11647		10nF
C711	4822 126 11647		10nF
C714	4822 121 43977		82nF
C715	4822 126 11647		10nF
C716	4822 121 43974		220nF
C717	4822 121 43974		220nF
C718	4822 126 11647		10nF
C719	4822 126 11647		10nF
C720	4822 126 11689		1nF
C724	4822 126 11629		1nF
C726	4822 126 11647		10nF
C728	4822 124 11224		elco,4.7μF
C729	4822 126 11641		10pF
C730	4822 124 23837		elco,47μF
C732	4822 1126 11599		270pF
Coil			
L703	4822 157 62378		47μH
L704	4822 157 62378		47μH
L705	4822 153 10397		33μH
L706	4822 157 62373		120μH
L707	4822 157 60104		100μH
L710	4822 157 60104		100μH
Sld1	4822 466 62067		shield case
Tp703	4822 265 20526		connector
Cn1	4822 265 41136		pin header,(extensi
Cn2	4822 267 51109		connector,(extensio
Cn70	4822 265 41138		connector
Video unit board			
pwba	4822 214 33382		video unit board assy
Sld1	4822 466 62069		shield plate
Sld2	4822 466 62068		shield case
Integ	rated circuit		
IC1	4822 209 30239		JCP0016-2
IC2	4822 209 30243		TL8827P
Transistor			
Q1	4822 130 60862		2SA1576(QRS)
Q5	4822 130 60862		2SA1576(QRS)
Q10	4822 130 60669		2SC4081(QRS)
Q11	4822 130 60997		DTC144WU
Q12	4822 130 60997		DTC144WU
Q13	4822 130 60997		DTC144WU
Q14	4822 130 60997		DTYC144WU
Q16	4822 130 60997		DTC144WU
Q18	4822 130 60669		2SC4081(QRS)
Q19	4822 130 60669		2SC4081(QRS)
Q20	4822 130 60669		2SC4081(QRS)
Q21	4822 130 60862		2SA1576(QRS)
Q22	4822 130 60862		2SA1576(QRS)
Q23	4822 130 60997		DTC144WU
Q24	4822 130 60862		2SA1576(QRS)
Q25	4822 130 60669		2SC4081(QRS)
Q26	4822 130 60669		2SC4081(QRS)
Q28	4822 130 60669		2SC4081(QRS)
Q29	4822 130 60669		2SC4081(QRS)
Q30	4822 130 60669		2SC4081(QRS)
Q31	4822 130 42593		DTA124ES
Q32	4822 130 62797		DTC144WU
Diode			

D1	4822 130 82708	1SS292Y
D3	4822 130 32778	1SS133
D4	4822 130 32778	1SS133
D5	4822 130 32778	1SS133
D6	4822 130 32778	1SS133
D7	4822 130 80375	DAN202U
D10	4822 130 32778	1SS133
D11	4822 130 32778	1SS133
D12	4822 130 32778	1SS133
D14	4822 130 32778	1SS133
D15	4822 130 32778	1SS133
D17	4822 130 80375	DAN202U
D19	4822 130 32778	1SS133
D20	4822 130 32778	1SS133
Resistor		
R1	4822 116 81525	chip,680R
R2	4822 116 82172	chip,4M7
R3	4822 116 82172	chip,4M7
R5	4822 116 81483	chip,1k3
R6	4822 116 83134	360R,1/10W
R10	4822 116 81482	chip,1k
R11	4822 116 81525	chip,680R
R12	4822 116 83128	1k,1/10W
R13	4822 116 81482	1k,1/6W
R16	4822 116 81511	chip,3k9
R18	4822 116 81508	chip,33k
R19	4822 116 81535	chip,82k
R21	4822 116 81506	chip,330R
R22	4822 116 83138	620R,1/10W
R23	4822 116 81519	chip,560R
R24	4822 116 81493	chip,1k8
R25	4822 116 81497	chip,2k2
R26	4822 116 81482	chip,1k
R27	4822 116 81494	chip,18k
R28	4822 116 81534	chip,8k2
R29	4822 116 81521	chip,5k6
R30	4822 116 81521	chip,5k6
R31	4822 116 81494	chip,18k
R32	4822 116 81521	chip,5k6
R33	4822 116 81521	chip,5k6
R35	4822 116 81507	chip,3k3
R36	4822 116 81521	chip,5k6
R37	4822 116 81507	chip,3k3
R38	4822 116 81507	chip,3k3
R40	4822 116 81482	chip,1k
R41	4822 100 11777	potm.carrier
R42	4822 115 50208	potm.deviation
R43	4822 116 81497	chip,2k2
R44	4822 116 83136	4k3,1/10W
R45	4822 116 81485	chip,1k2
R46	4822 116 83135	360R,1/10W
R47	4822 116 81483	chip,1k3
R48	4822 116 81476	chip,1k
R49	4822 116 81483	chip,1k3
R51	4822 116 81482	chip,1k
R52	4822 116 81482	chip,1k
R53	4822 116 81482	chip,1k
R54	4822 116 81501	chip,2k4
R55	4822 116 81511	chip,3k9
R56	4822 100 11778	potm.n.C ball.
R57	4822 116 81482	chip,1k
R58	4822 116 81533	chip,820R
R59	4822 116 81482	chip,1k
R60	4822 100 11779	potm.ee level
R61	4822 116 81482	chip,1k
R62	4822 116 82169	chip,330k
R63	4822 116 81482	chip,1k
R64	4822 101 30679	potm.white clip
R65	4822 116 81483	chip,1k3
R66	4822 116 83137	560k,1/10W
R67	4822 116 81482	chip,1k
R68	4822 116 81482	chip,1k
R69	4822 116 81482	chip,1k
R70	4822 116 81514	chip,470R
R71	4822 116 81485	chip,1k2
R72	4822 116 81508	chip,33k
R73	4822 116 81508	chip,33k
R74	4822 116 81525	chip,680R
R75	4822 116 81519	chip,560R
R76	4822 116 81482	chip,1k
R77	4822 116 81521	chip,5k6
R78	4822 116 81525	chip,680R
R79	4822 116 81497	chip,2k2
R81	4822 116 82172	chip,4M7
R83	4822 116 81503	chip,2k7
R84	4822 116 81484	chip,1M
R85	4822 116 81866	chip,1M5
Capacitor		
C1	4822 126 10027	chip,220pF
C2	4822 126 10026	chip,22pF
C4	4822 126 11626	chip,560pF
C8	4822 126 11619	chip,47nF
C9	4822 126 10023	chip,15pF
C11	4822 126 10034	chip,68pF
C12	4822 126 10026	chip,22pF
C13	4822 126 11622	chip,120pF
C14	4822 126 11621	chip,10nF
C16	4822 126 11621	chip,10nF
C17	4822 126 11621	chip,10nF
C18	4822 122 33991	chip,82pF
C19	4822 124 23854	elco,0.47µF
C20	4822 126 11621	chip,10nF
C21	4822 124 23854	elco,0.47µF
C22	4822 124 23848	elco,4.7µF
C23	4822 124 23286	elco,10µF
C24	4822 124 23835	elco,22µF
C25	4822 124 23286	elco,10µF
C26	4822 124 23842	elco,330µF
C27	4822 126 11621	chip,10nF
C29	4822 126 11621	chip,10nF
C30	4822 124 23852	elco,2.2µF
C31	4822 124 23854	elco,0.47µF
C32	4822 126 11624	chip,200pF
C33	4822 126 11393	chip,22nF
C34	4822 124 23848	elco,4.7µF
C35	4822 126 11623	chip,15pF
C36	4822 124 23287	elco,1µF
C37	4822 126 11393	chip,22nF
C38	4822 122 33986	chip,100pF
C40	4822 122 33988	chip,39pF
C41	4822 126 10055	chip,100nF
C42	4822 124 23843	elco,47µF
C43	4822 124 23286	elco,10µF
C44	4822 126 11621	chip,10nF
C45	4822 124 23286	elco,10µF
C46	4822 126 11621	chip,10nF
C47	4822 124 23287	elco,1µF
C48	4822 126 11621	chip,10nF
C49	4822 122 90058	4.7nF
C50	4822 126 11621	chip,10nF
C51	4822 126 11621	chip,10nF
C52	4822 124 23287	elco,1µF
C53	4822 124 23286	elco,10µF
C54	4822 126 11621	chip,10nF
C56	4822 124 23836	elco,4.7µF
C57	4822 124 23847	elco,3.3µF
C58	4822 124 23848	elco,4.7µF
C59	4822 126 11619	chip,47nF
C60	4822 126 11621	chip,10nF
C61	4822 124 23854	elco,0.47µF
C62	4822 126 11618	chip,33nF
C63	4822 126 11621	chip,10nF
C64	4822 124 23849	elco,0.1µF
C65	4822 126 11621	chip,10nF

C66	4822 124 23849	elco,0.1μF
C67	4822 126 11619	chip,47nF
C69	4822 126 11621	chip,10nF
C70	4822 126 11619	chip,47nF
C71	4822 122 90053	2.7nF
C72	4822 124 23848	elco,4.7μF
C73	4822 124 23287	elco,1μF
C74	4822 124 23839	elco,10μF
C75	4822 126 11621	chip,10nF
C76	4822 126 11621	chip,10nF
C77	4822 124 23849	elco,0.1μF
C78	4822 126 11647	10nF
C79	4822 126 11621	chip,10nF
C80	4822 126 11627	chip,24pF
C82	4822 124 23852	elco,2.2μF
C84	4822 126 10025	chip,18pF
C91	4822 126 11628	chip,62pF
C93	4822 126 11621	chip,10nF
C95	4822 126 10021	chip,12pF
C96	4822 126 11621	chip,10nF
C97	4822 121 70007	33nF
C98	4822 126 10015	chip,1nF
C99	4822 126 10025	chip,18pF
C100	4822 126 11625	chip,360pF
C102	4822 121 43972	100nF
Coil		
L1	4822 157 62373	120μH
L3	4822 153 10397	33μH
L4	4822 153 10397	33μH
L5	4822 153 10397	33μH
L6	4822 157 90199	82μH
L7	4822 157 60066	220μH
L8	4822 157 60104	100μH
L9	4822 157 60104	100μH
L10	4822 157 62381	68μH
L11	4822 157 60104	100μH
L12	4822 157 60104	100μH
L13	4822 157 63398	560μH
L14	4822 157 63396	2.2mH
L15	4822 157 62374	15μH
L16	4822 157 90199	82μH
Lpf1	4822 157 63392	l.p.filter
Lpf2	4822 157 63393	l.p.filter
Lpf3	4822 157 63405	l.p.filter
Dl1	4822 157 63406	comb filter
X1	4822 242 80339	xtal resonator
Cn1	4822 265 41135	pin header
Cn2	4822 265 41135	pin header
Cn3	4822 265 41135	pin header
Audio/Controlhead board		
pwb1	4822 214 33379	audio/control head a
trap	4822 403 70461	wire trap
Cn1	4822 265 41139	connector
Timer/Display/SW board		
pwba	4822 214 33383	timer/display/sw. Bo
Integrated circuit		
IC1	4822 209 30244	UPD75212ACW-270
IC2	4822 209 30238	IC-PST523H-2
IC10	4822 209 30237	ir detect unit
Transistor		
Q1	4822 130 42483	2SC1740S(RS)
Diode		
D1	4822 130 80793	RD9.1ES-T1B2
D2	4822 130 32778	1SS133
D3	4822 130 32778	1SS133
D4	4822 130 81748	11ES2
D5	4822 130 81748	11ES2
D6	4822 130 80604	RD10ESB2
D7	4822 130 32778	1SS133
D111	4822 130 80589	1SS132
D112	4822 130 80589	1SS132
D124	4822 130 80589	1SS132
D128	4822 130 80589	1SS132
Resistor		
R1	4822 116 81636	10k,1/6W
R2	4822 116 81641	4k7,1/6W
R3	4822 050 12703	6k8,1/6W
R4	4822 050 16802	6k8,1/6W
R5	4822 116 81638	33k,1/6W
R6	4822 116 81638	33k,1/6W
R7	4822 116 81536	1k,1/6W
R8	4822 116 81636	10k,1/6W
R9	4822 116 81636	10k,1/6W
R10	4822 116 81636	10k,1/6W
R11	4822 116 81636	10k,1/6W
R12	4822 116 81638	33k,1/6W
R13	4822 116 82083	270R,1/6W
R14	4822 116 82083	270R,1/6W
R15	4822 116 81636	10k,1/6W
R16	4822 116 81636	10k,1/6W
R17	4822 116 81641	4k7,1/6W
R18	4822 116 81638	33k,1/6W
R19	4822 116 81638	33k,1/6W
R20	4822 116 81638	33k,1/6W
R21	4822 116 81638	33k,1/6W
R22	4822 116 82083	270R,1/6W
R23	4822 116 82083	270R,1/6W
R24	4822 111 50565	220k,1/6W
R25	4822 116 81636	10k,1/6W
R26	4822 116 81636	10k,1/6W
R28	4822 116 81638	33k,1/6W
Ra1	4822 111 92038	res. array
Capacitor		
C1	4822 124 23286	elco,10μF
C2	4822 126 11647	10nF
C3	4822 126 11647	10nF
C4	4822 124 23286	elco,10μF
C5	4822 124 23823	elco0.47μF
C6	4822 125 60175	trimmer
C7	4822 126 11642	12pF
C8	4822 124 23839	elco,100μF
C9	4822 124 23851	elco,10μF
C10	4822 124 23286	elco,1μF
C11	4822 126 10419	100pF
C12	4822 126 10419	100pF
C13	4822 126 11638	47nF
C14	4822 126 11647	10nF
X1	4822 242 80341	xtal (m)
S1	4822 276 13136	tact switch,power
S2	4822 276 13136	tact switch,stop
S3	4822 276 13136	tact switch,ff
S4	4822 276 13136	tact switch,rew
S5	4822 276 13136	tact switch,ch+
S6	4822 276 13136	tact switch,rec
S7	4822 276 13136	tact switch,play
S8	4822 276 13136	tact switch,ch-
Fdp1	4822 130 91018	fluorescent display
Hd1	4822 256 91795	fdp holder(r)
Hd2	4822 256 91794	fdp holder(l)
Cn1	4822 403 70458	wire trap
Deck terminal board		
Pwba	4822 214 33376	deck terminal board
Transistor		
Q1	4822 130 82706	end sensor
Resistor		
R1	4822 116 81536	1k,1/6W
R3	4822 116 82084	330R,1/6W
R4	4822 116 82084	330R,1/6W
Capacitor		
C1	4822 126 10039	chip,10nF
C2	4822 126 11637	22nF
Ps1	4822 130 82705	ph interrupter
Cn1	4822 403 70456	wire trap
Cn2	4822 265 41137	7pin connector

Cn3	4822 265 30908	4pin connector
Loading mda board		
Pwba	4822 214 33377	load.mda board as
Integrated circuit		
IC1	4822 209 30245	xra6418n
C1	4822 124 23846	elco,47μF
C3	4822 121 43348	22nF
Spc1	4822 462 41856	spacer
Cn1	4822 403 70462	wire trap
Cassette housing board		
Pwb1	4822 214 33378	cass.housing board
Transistor		
Q2	4822 130 62798	photo transistor
C1	4822 126 11631	10nF
Phs3	4822 130 82707	cass.sensor
Cn2	4822 267 41014	4pin socket
Full erase head board		
Pwb1	4822 214 33365	f.e.head board
Lubricants		
Oil	5322 390 10096	cosmo-hv56
Greas	e4822 389 10001	kanto-g-31kav
Tools		
	4822 397 30107	alignm.tape MH2
	4822 395 80196	torque gauge
	4822 395 80198	gauge head
	4822 395 90615	tape tens.cass.
	4822 395 90614	a/c head tool
	4822 395 90904	roller driver

SECTION 6
TECHNICAL INFORMATIONS

6.1 CPU PIN FUNCTIONS

1. Mechacon CPU pin function (IC601)

Pin	Symbol	I/O format	Label	I/O	Contens
1	P6 3	C MOS	LCM1	O	LOADING MOTOR DRIVER
2	P6 2		LCM2	O	
3	P6 1/DA2		D CTL V	O	fh CORRECTION VOLTAGE for SPECIAL PB
4	P6 0/DA1		CAP V	O	CAPSTAN MOTOR DRIVE VOLTAGE
5	P4 7/AN7	Nch O.D	S CURVE	I	AFC DETECTION(for TUNING)
6	P4 6/AN6		STT. S	I	LEADER TAPE DETECTION(DET:L)
7	P4 5/AN5		LSB	I	MECHANISM MODE DETECTION
8	P4 4/AN4		AV FM	I	DIGITAL TRACKING DATA(VOLTAGE)
9	P3 7		LSA	I	MECHANISM MODE DETECTION
10	P3 6/CLK		TCLK	I	TM(TIMER/MECHACON) BUS 16BIT SERIAL DATA/CLOCK
11	P3 5/DATA		T DATA	I/O	
12	P3 4		DSTT	O	DRUM MOTOR START CONTROL(START:H)
13	P3 3/CNTR		PAUSE	O	CAPSTAN MOTOR SERVO
14	P3 2/R/W		SERVO	O	CAPSTAN MOTOR SERVO
15	P3 1/INT2		CAP FG	I	MODE(SP/LP/EP) DETECTION/BACK SPACE
16	P3 0/INT1		CTL PULSE/SYNC	I	PB:MODE DETECTION/EE:SYNC DETECTION
17	P5 7/PWM	C MOS	PWM	O	TUNING DATA OUTPUT
18	P5 6/YPLS	3-STATE	DCTLP	O	CTL PULSE INPUT CONTROL (SELECTED CTL PULSE: L)
19	P5 5/Q		D SYNC	O	SYNC INPUT CONTROL (SELECTED SYNC: L)
20	P5 4/VPLS		V PULSE	O	V PULSE WIDTH CONTROL(for SPECIAL PB)
21	P5 3/T/ED3	-	D FF	I	DRUM ROTATION DETECTION/REC TIMING
22	CNVss/SYNC		CNVss	I	GND
23	RESET		RESET	I	RESET AT CONNECT VCR TO AC
24	X IN		X IN	I	MAIN SYSTEM CLOCK (8 MHz)
25	X OUT/ϕ		X OUT	O	
26	Vss		Vss	I	GND
27	P5 2/ED2	-	TU FG	I	REEL ROTATION DETECTION
28	P5 1/ED1		NC	–	NC
29	P5 0/EDO		END SENSOR	I	TRAILER TAPE DETECTION(DET:L)
30	P1 5(A13)	Nch O.D	PCTL	O	POWER ON/OFF CONTROL(ON:L)
31	P1 4(A12)		REV	O	CAPSTAN REVERCE CONTROL(REV:L)
32	P1 3(A11)		VHF-H	O	BAND SELECT (VHF-H: L)
33	P1 2(A10)		EE	O	EE MODE SELECTION(EE:L)
34	P1 1(A9)		REC	O	REC MODE SELECTION(REC:L)
35	P1 0(A8)		REC START	O	REC START CONTROL(REC START:L)
36	P0 7(A7)		AFC DEF	O	AFC CONTROL (AFC OFF: L)
37	P0 6(A6)		VIDEO	O	VIDEO MODE SELECTION(VIDEO:L)
38	P0 5(A5)		CASS SENSOR	I	CASSETTE IN/OUT DETECTION
39	P0 4(A4)		P MUTE	O	PICTURE MUTE CONTROL(P MUTE:L)
40	P0 3(A3)		VP ON	O	V PULSE CONTROL (SPECIAL PB: L)
41	P0 2(A2)		REC SF	I	ERASE PROTECT TAB DETECTION(DET:L)
42	P0 1(A1)		VHF-L	O	BAND SELECT (VHF-L: L)
43	P0 0(A0)		UHF	O	BAND SELECT (UHF: L)
44	P2 7(D7)	C MOS	M DATA	I/O	MEMORY DATA CONTROL (WRITE/READ)
45	P2 6(D6)		MCE	O	CHIP ENABLE
46	P2 5(D5)		AUX	O	INPUT SIGNAL SELECTION(TUNER:H)
47	P2 4(D4)		A MUTE	O	AUDIO MUTE CONTROL(A MUTE:H)
48	P2 3(D3)		V MUTE	O	PICTURE MUTE CONTROL (P MUTE: H)
49	P2 2(D2)		S/M CLK	O	CLOCK(COMMON)
50	P2 1(D1)		S DATA	O	16BIT SERIAL DATA(for SERVO)
51	P2 0(DO)		TU CTL	O	TUNER CONTROL (TUNER MODE: H)
52	Vcc	-	Vcc	I	Vcc(for SYSTEM CONTROL)

Table 6-1-1 Mechacon CPU (IC601) pin function

2. IC1 pin function (Timer)

Pin No.	Symbol	Label	I/O	Contents
1	S3	Sd	O	SEGMENT DISPLAY DATA /KEY SCAN PULSE OUTPUT
2	S2	Sc		/ "
3	S1	Sb		
4	S0	Sa		
5	P00/INT4	POWER DOWN	I	POWER DOWN DETECT (DETECT ON: L)
6	P01/SCK	NC	—	NC
7	P02/SD	NC		
8	P03/SI	TEST	I	TEST POINT (CLOCK ADJUST/FDP CHECK/X10 SPEED set)
9	P10/INT0	REMOTE	I	REMOTE DATA INPUT
10	P11/INT1	NC	—	NC
11	P12/INT2	CNT PLS	I	COUNTER DATA (REALTIME COUNTER DATA)
12	P13/T10	CNT PLS		
13	P20	KS0	I	KEY SCAN DATA INPUT
14	P21	KS1		
15	P22	KS2		
16	P23/BUZ	KS3		
17	P30	M/C DATA	I/O	TM (TIMER/M-CTL CPU) bus : 16 bit DATA
18	P31	M/C CLK	O	: CLOCK
19	P32	SDA	—	NC
20	P33	SCL		
21	P60	NC	—	NC
22	P61	NC		
23	P62	NC		
24	P63	NC		
25	P40	POWER	O	LED CONTROL (LED ON: L)
26	P41	NC	—	NC
27	P42	NC		
28	P43	NC		
29	PP0	NC		
30	X1	X1	I	MAIN SYSTEM CLOCK (4.19 MHz)
31	X2	X2	O	
32	Vss	Vss	—	GND
33	XT1	XT1	I	GND (ALWAYS GND)
34	XT2	NC	—	NC
35	P50	NC		
36	P51	NC		
37	P52	NC		
38	P53	NC		
39	RESET	RESET	I	RESET AT CONNECT VCR TO AC
40	T0	4G	O	COLUMN DISPLAY DATA
41	T1	3G		
42	T2	2G		
43	T3	1G		
44	T4	NC	—	NC
45	T5	NC		
46	T6	NC		
47	T7	NC		
48	T8	NC		
49	T9	NC		
50	T10/S15/PH3	SP	O	SEGMENT DISPLAY DATA /KEY SCAN PULSE OUTPUT
51	T11/S14/PH2	So		/ "
52	T12/S13/PH1	Sn		
53	T13/S12/PH0	Sm		
54	T14/S11	SI		
55	T15/S10	Sk		
56	VLOAD	VLOAD	I	−28 V /For the FDP DRIVE
57	VPRE	VPRE		−5 V
58	S9	Sj	O	SEGMENT DISPLAY DATA /KEY SCAN PULSE OUTPUT
59	S8	Si		/ "
60	S7	Sh		/ "
61	S6	Sg		/ "
62	S6	Sf		
63	S4	Se		
64	VDD	VDD	I	5V /For the SYSTEM CONTROL

Table 6-2 TIMER CPU (IC1) pin functions